How to assess an exit strategy: Measures of Merit for compliance

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Abstract

In order to exit from a theater such as Iraq, where the objective is to ensure a secure environment, it is necessary to change the intentions of non-compliant parties. Relying on indices such as numbers of incidents/fatalities is not enough; only parties' intentions can tell us whether the environment is likely to deteriorate *after* the military force has left.

Commanders must rely on cooperation from civilian agencies to affect a change in the intentions of non-compliant parties – the agencies control many of the necessary "carrots and sticks".

A plan for achieving compliant intentions is implemented first and foremost by the "commander as shooter". Line commanders at each level have to work with civilian agencies to put pressure on non-compliant parties at their level. They do this by interacting *personally* (or through their immediate delegates) both with representatives of civilian agencies and with non-compliant parties.

A system for Command and Control of Confronting and Collaborating, or a C2CC system, supports joint strategy formation and implementation by a coalition of the International Community. This paper discusses valid Measures of Merit for such a system, and applies them to a fictitious example based on experience in NATO exercises.

"Commander as shooter"

Effects Based Operations (EBO) are generally discussed as attempts to bring about effects through actions at ground level, where "shooters" are found [1]. Under this model, the commander and his staff give directions that, after passing through several levels, result in directions being given to "shooters". This follows the model of war-fighting, where the commander directs activities on the ground by developing and choosing courses of action (COAs) for his subordinate commanders, who take these as their missions and, in turn, develop and delegate COAs to achieve them. Actual effects are (eventually) achieved by "shooters".
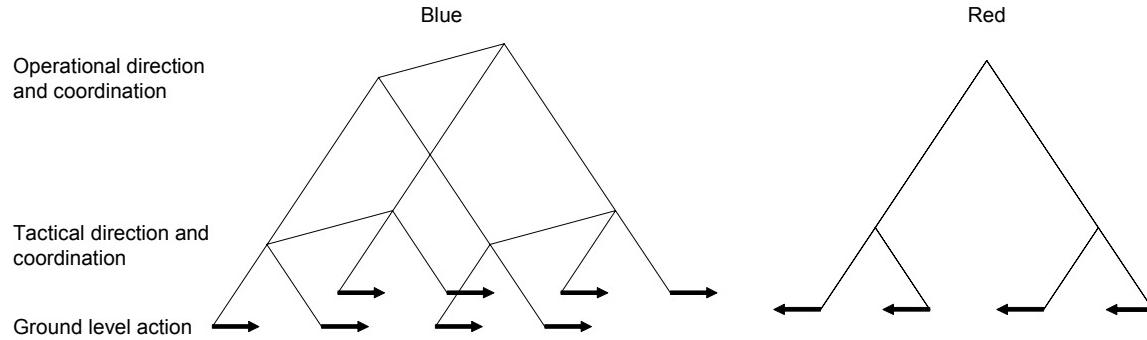
Figure 1: Achievement of effects through war-fighting at ground level

This concept is shown very simply in Figure 1, where arrows represent actions that achieve effects through war-fighting. The horizontal lines show coordination between corresponding command levels in a coalition of Blue forces.
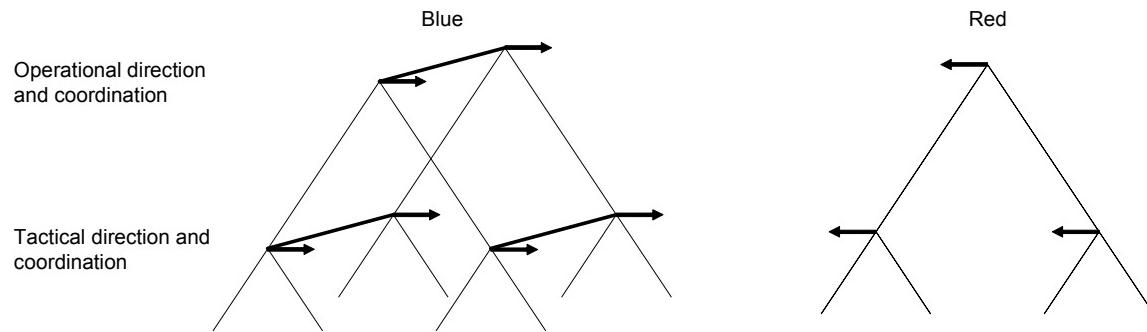

Figure 2: How the "commander as shooter" affects non-compliant parties' intentions

By contrast, in a stabilization and reconstruction operation a commander is responsible for more than directing lower-level shooters – though he retains this responsibility. He himself is a "shooter", directly affecting the intentions of non-compliant parties at his own level [2]. He achieves their compliance by personally confronting representatives of non-compliant parties, in coalition with civilian agencies with whom he collaborates. This is shown in Figure 2, where the arrows represent the confronting and collaborating (CC) actions of commanders at each level.

Note that in Figure 2:

- CC is focused on communication – not physical action – and includes all levels of command. CC actions are taken by commanders at the appropriate level, whatever that may be – for example, a private soldier guarding an alleyway and deciding whether to turn back a civilian is a commander in that situation, just as a

Combined Joint Task Force (CJTF) commander is the relevant commander when it comes to interacting with theater-level non-compliant parties.

- The horizontal lines represent coordination between coalition partners, rather than actions that achieve desired effects. They are drawn with heavy lines because they represent an essential CC activity for a commander. He must achieve collaboration with coalition partners, particularly the all-important civilian agencies, in order to coordinate action with them. Civilian agencies control many of the "carrots and sticks" required to affect a change in the intentions of non-compliant parties.

A commander is responsible for CC in relation to non-compliant parties at his level for a simple reason: he alone decides whether or not to use dominant force in the situation. Furthermore, in a stabilization and reconstruction theater it is necessarily the case that the threat to use force is an essential factor; if it were not, there would be no need for the commander or the military to be there – the exit conditions would already have been met. Finally, the force available to the commander is necessarily *dominant* force, or we would have to say he is still doing war-fighting rather than stabilization and reconstruction.

Thus the commander's role is vital – though it may recede into the background as stabilization progresses. Obviously, the military commander will lead discussions with non-compliant parties when the issue is the disarming of ethnic factions. Other agencies will generally take the lead over issues such as aid and refugee returns. But even when civilian agencies take the lead, the commander's support for their positions is bound to be noted and seen as significant.

Altering intentions

How are intentions changed? Personal communications from leader to leader – as when a military commander or civilian agency representative confronts an ethnic leader – are the essential means for altering non-compliant intentions.

Other methods of communication are also important—among them concrete actions. If we ask, "At what point does a party change its objective from B to A?" – the answer is: when it comes to prefer the future offered by pursuing A to that offered by pursuing B.

Now, communication is the method by which beliefs about different futures and preferences for them are changed. But to be effective, communication must be credible; and to achieve credibility, concrete actions may be needed. Threats and promises may need to be carried out, at least partially, in order to be credible. Talk, as they say, is cheap – and "saying it" may not be enough without "showing it". Deployment, for example, sends a physical message of readiness to act, and may therefore be necessary to make a threat of action credible. In this way, physical actions may be a key part of the actions necessary to change parties' objectives.

But though physical actions may be necessary, they are never sufficient unless communication has embedded them in an interpretive framework. The other side needs to know what they mean. Deployment to be ready for action is useless in making a threat credible if it is interpreted as something else – eg, withdrawal – or if it is kept secret.

In general, communication that brings about desired change is of two kinds. In military terminology, a force directs two kinds of communications "fire" at friends, foes and neutral parties: "functional" fire and "line" fire.

- Functional fire is delivered by functions such as PSYOPS, Public Information, CIMIC and Information Operations. It is important that it should support the commander's intent by delivering his message about the alternative futures that await non-compliant parties.

- Line fire is what finally brings the desired result. It is the "eyeball-to-eyeball" interaction between the commander or civilian agency representative (at each level of command), or his/her immediate delegate, and representatives or leaders of other parties. Key individuals are convinced of the need to change their position or intentions when they meet, look into your eyes and are personally told what alternatives they have. It is in delivering this kind of "fire" that the commander is an essential "shooter".

A prince wooing a princess may employ violinists to serenade her balcony. Such functional fire can help a lot. But the prince himself must finally approach her to ask for her hand. This is line fire.

As said, it is delivered at each level of command. Tactical commanders do it at their level. From the level of company commander down to private soldier, line warriors get into crucial "eyeball-to-eyeball" interactions with representatives of other parties. A company commander interacts personally with a mayor, sheikh, doctor, engineer or local bureaucrat. A platoon commander leading a patrol interacts with the leader of a gang or small local community. The private soldier guarding an alleyway is in command there.

The functional warrior can send a message. The line commander concludes the basic agreements needed for mission fulfillment—ie, for changing the intentions of non-compliant parties.

Thus, although the commander's CC task is essentially one of communication, he cannot delegate it to functional specialists in PSYOPS, Public Information, CIMIC and Information Operations. He should, however, delegate missions to these "functional" warriors that will support him in his personal task as a CC "shooter".

C2CC systems – their nature and purpose

All these fires – functional fires at each level and line fires conducted personally by line commanders and by civilian agency representatives – need to be coordinated and directed to achieve a unified strategic aim. This is the function of a system for Command and Control of Confronting and Collaborating – ie, a C2CC system.

Though a formal system is not set up, stabilization and reconstruction commands generally operate C2CC systems in this sense. They have to, in order to do their job. But formally defining system requirements and consciously organizing to meet them will make these *ad hoc* systems more effective.

Teams from dramatec and Idea Sciences have observed and assessed the C2CC systems in use on two NATO exercises – Allied Effort 01 and Allied Action 03. They have also observed C2CC in action in Bosnia, and been able to consult with experienced commanders and civilian agency heads at various levels. Based on such experience, this paper will outline a proposed formal system and suggest Measures of Merit (MoMs) that could be used as part of the system in order to evaluate the effectiveness of CC actions.

First, what are the general requirements for a formal C2CC system? We have said that a military commander is an essential CC "shooter", alongside civilian agencies, in the CC campaign, and that the military also contributes its own CC functional fire. But in addition to these functions, the military can also contribute logistical and intelligence resources far greater than any available to civilian agencies. Using these resources, a C2CC system run and maintained by the military can coordinate civilian and military CC actions and information throughout the theater. Based on an analysis of how to achieve CC effects, the system can provide and update relevant information and support joint civil-military planning of all CC actions.

As an example, consider the CC needs of the theater commander. His targets, considered as a "shooter", are not only the leaders of non-compliant governments, factions or groups. He must also target the UN High Representative, heads of UNHCR and UNCIVPOL, etc., in order to get their cooperation in confronting non-compliant parties. He or his immediate delegates must personally meet with these people, both in joint commissions (such as the Joint Military Commission and Joint Civil Commission) and also bilaterally. His aim: to get all the members of the international community to cooperate in a joint plan to bring the non-compliant parties into compliance.

Thus, he must first work upon the intentions and objectives of other members of the international community, then, in a coordinated plan with them, upon the intentions and objectives of non-compliant parties.

Under the present, informal arrangements, he generally picks out a small staff, including Political Advisers (POLADs), to help him in this CC work. A C2CC system would give analytical and informational support to this staff, so that they can be more effective in helping him to:

- Plan his personal CC actions.

- Coordinate his actions within this plan by briefing and debriefing him and his immediate delegates before and after they interact with other international community members and with non-compliant parties.

- Delegate CC missions to subordinate line and functional commanders, making their actions more mutually supportive.

- Explain his CC actions to his strategic and political superiors, enabling them to be more mutually supportive.

- Facilitate and support joint civil-military CC planning, enabling the commander and civilian agencies to coordinate their approach to non-compliant parties.

It is important to understand that, because of this last requirement, an effective C2CC system cannot be used solely by the military. It needs to be a dual system. As well as having its own internal system, the military needs to support a system that it fully shares with other members of the international community.

Due to the need to safeguard military intelligence, this implies that the system should be comprised of two components: an internal, militarily secure component from which information is screened for input into an external, shared system. The latter exists to support joint civil-military planning sessions through which the international community as a whole forms and updates a common plan for achieving the compliance of the non-compliant parties.

Such planning sessions can and should be supported by information systems and facilitators (who are responsible for process, not content) supplied by the military.

Two important principles are that this joint civil-military compliance planning should not use any information that is not fully shared among its members and should be led by whichever international community member is appropriate, given the specific CC operation being planned.

The former principle, in limiting access to sensitive information, adds to the CC challenges facing commanders. Civilian agencies cannot be asked to collaborate unless they feel themselves to be in full possession of all the facts. Thus, the commander must ensure that the military collaborating with civilians do not make use of any information that is not fully shared between them.

CCA in support of C2CC: agreeing a position and implementing it

Confrontation and Collaboration Analysis (CCA) provides a formal framework for modeling and analyzing confrontations and collaborations. How can CCA help in both the joint international community planning sessions and the military commander's CC planning?

Central to CCA is the concept of "positions" – ie, espoused end-states. Getting non-compliant parties to accept the international community's position on various issues is generally the first in a sequence of effects that the international community needs to achieve; that is, its first objective is to get non-compliant parties to adopt compliant positions in relation to those issues.

After having achieved overt consent to a single, agreed position, the international community's second objective is to ensure actual compliance with that position. We stress this because it would, of course, be naïve to assume that non-compliant parties in a stabilization and reconstruction theater will necessarily do what they have agreed to do. A plan for ensuring actual compliance must be developed by analyzing tensions between the common agreed position and the actual perceived interests of the non-compliant parties.

CCA is a tool for analyzing both how to get others to agree to your position and how to get them to implement what they have agreed to.

But, as we have said, to make joint civil-military planning possible, a commander must first get members of the international community to cooperate in such planning. Now, working with civilian agencies is often the most troublesome of a commander's interactions[1]. These agencies tend to have deep cultural differences with the military. Their representatives may have pacifist or other political motivations that make them reluctant to work with military officers.

From the viewpoint of a civilian agency, it often seems that the military approach to achieving compliance is ignorant, insensitive and naïve. They demand quick results. They

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[1] This was determined during discussions with commanders, at nearly every level, on active duty in Operation Joint Force, Bosnia, 1999 – and has been further confirmed in subsequent discussions between the authors and (active and retired) commanders.

consult within themselves to come up with a plan that they present to the civilian agency as a *fait accompli*, expecting them to salute and accept the task assigned to them as if they were subordinates.

The military, for their part, often come to suspect civilian workers of having a vested interest in leaving problems unsolved while they spend the money allocated to them on personal luxuries. They are shocked by civilian laxness, indiscipline and unwillingness to plan and coordinate.

To solve these problems, the operational commander must develop and implement a plan for getting the civilian agencies to collaborate. This "collaboration" plan is, of course, confidential within the military. It cannot be revealed to the parties (civilian agencies) that it is aimed at. In an organized C2CC system, it is maintained and updated in the militarily secure component of the system. Its objective, however, is not to get civilians to sign up to a plan for joint action against non-compliant parties that is drawn up unilaterally by the military. It is to get their participation in a joint civil-military compliance planning *process*, by which the military and civilian agencies together draw up a plan. This is the only kind of joint planning that will be effective, as civilian agencies will not willingly follow a plan drawn up by the military.

The same CCA concepts apply to "collaborative" confrontations with civilian agencies as apply to confrontations with non-compliant parties. First, the commander gets international community members to agree to his position – that there should be joint planning in relation to certain issues. Then he makes sure that they carry out this agreement.

Note that it is generally the case that sufficient "carrots and sticks" are available to the military to make this possible – bearing in mind that joint planning is in the interests of both parties, and not a matter of subordinating one to the other.

Once drawn up, the compliance plan is implemented through the separate activities of the military and civilian agencies involved. These parties also devolve their parts of the plan to lower levels within their organizations. As implementation proceeds, the plan is continually revised and information updated through further meetings of the joint civil-military group.

Here again a formal C2CC system can greatly increase effectiveness. We should repeat, however, that joint civil-military compliance planning cannot have the same kind of secure confidentiality as internal military planning, since the information on which it is based is fully shared with civilian agencies. As far as possible, they will want to keep it confidential. However, the military will not regard civilian systems as sufficiently secure to afford a guarantee. Consequently, the joint civil-military system must be a component of the overall C2CC system that is kept separate from militarily secret systems, with intelligence being screened before being put into it.

In this way, optimal use can be made of military information. The flow of information is not, however, one-way. Civilian agencies cooperating with the military can be the source of much important information of use to the military.

What is CCA?

Appendix 1 provides a list of background references for those seeking a more detailed understanding of CCA. It is a method of analyzing how a party can use threats, promises and sanctions to convince other parties to accept a given proposal, and, once accepted, to adhere to it.

CCA's basis in mathematics makes it an ideal platform for the development of a computer-based C2CC system; as the system is extended, its consistency can be guaranteed through parallel theoretical developments. At the same time, staff using CCA, though they need training, do not need mathematical knowledge. Two days' training will be necessary for staff assisting in an analysis, seven days for staff conducting an analysis and manipulating models. The commander using CCA with staff assistance will not need to understand the general method in order to understand his specific situation. He will, therefore, be able to retain ownership of the models while delegating the model development to his staff.

Options Boards and Tug of War diagrams

Options Boards and Tug of War diagrams are CCA tools for modeling interactions between parties, holding the relevant information and making its relevance clear. A

common, well-defined representation scheme makes it easy to share plans and analyses. Thus these tools form the natural basis for a C2CC system.

We will begin by showing how these tools are used in a confrontation – ie, an interaction in which parties take overtly opposing positions. They are used in a slightly different way in a collaboration – an interaction where parties' overt positions agree, but there is doubt whether some parties will implement the common position. Our description of the tools is illustrated by a simple analysis of the Israeli-Palestinian conflict that remains relevant even though done early in 2003.
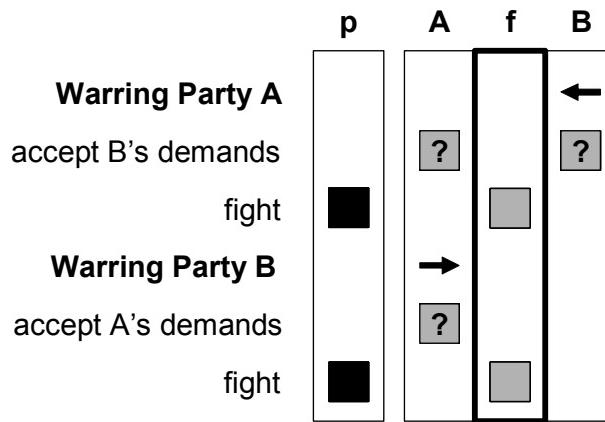
Figure 3: Options Board showing a typical pre-intervention confrontation

The Options Board in Figure 3 illustrates a generic pre-intervention confrontation. Two parties are in conflict over an issue (or multiple issues). Their refusal to yield to each others' demands – or to find common ground – has led them to war. Note that the method can accommodate any number of parties—it is not limited to two.

This Options Board has four columns, representing different possible "futures":

- p (present intentions) – the future according to current actions and intentions

- A – A's position

- f (fallback) – the future that would result if parties' threats are carried out (it is the same, in this case, as the present intentions)

- B – B's position

A shaded square in a future indicates that, under that future, the corresponding option would be implemented (ie, that "card" would be played). For example, the present

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intentions involve both A and B fighting. Conversely, a "blank" (ie, no shaded square) indicates an option that would *not* be implemented in this future.

Note that the present intentions future is offset from the other futures and uses solid (as opposed to shaded) squares to indicate implemented options. The present intentions are not part of the dynamics of the interaction and, within CCA, are merely used as a device to help anchor the definitions of the other futures. The squares within the positions and the fallback denote *stated* intentions; the squares within the present intentions denote the *current reality*.

Horizontal arrows across from a party show the direction of preference for that party. So, in Figure 3, A prefers the fallback to B's position. These preferences are *always* between a given position (ie, the one represented by the column containing the arrow) and the fallback.

Question marks ("?") show doubts that the indicated choice would be implemented – eg, B might not be trustworthy if it were to state an intention to accept A's demands. It is important to bear in mind that both preferences and doubts *refer to perceptions of the relevant parties* – eg, the doubt in B's position refers to B's suspicions rather than to A's actual intentions.
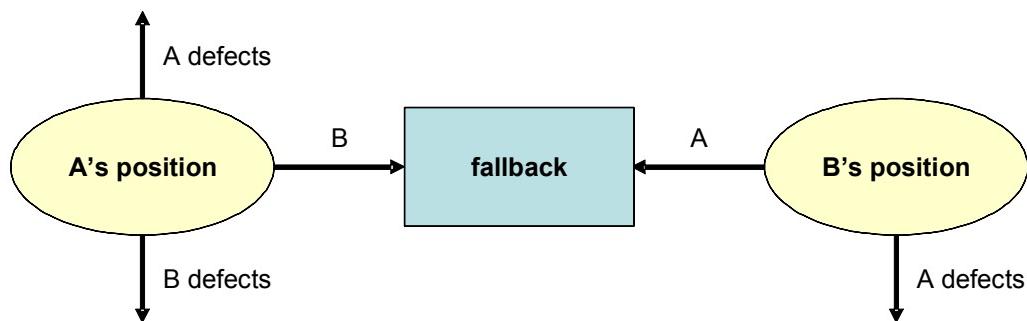

Figure 4: Tug of War for a typical pre-intervention confrontation

The arrows and question marks in Figure 3 point to strengths and weaknesses in the parties' positions. The Tug of War in Figure 4 sums up these strengths and weaknesses. The horizontal arrows correspond to the arrows in the Options Board; the vertical arrows correspond to the question marks.

Tugs of War are designed to represent the *dynamics* of CC more effectively than Options Boards. Note that the present intentions are not formally present in the Tug of War. This is because they are not relevant to the dynamics of the interaction.

Now, you are certain to win a Tug of War if both (or all) horizontal arrows point toward you and no vertical arrows go from your position or from the fallback. (Note that although in Figure 4 no vertical arrows leave the fallback, in general they may do so, as parties' threats may not be believed.)

How can we make the above statement? Because:

- The fact that no vertical arrows leave the fallback means that it is credible – ie, both parties believe and are thought to believe that this future awaits them if they stick to their positions.

- The fact that no vertical arrows leave your position means that it is credible – ie, if accepted by both parties it is believed it would be implemented.

- Preferring the fallback to the other party's position, you are under no pressure to accept it.

- Preferring your position to the fallback, the other party is under unilateral pressure to accept your position.

Now, *each party knows this* (consciously or unconsciously). Therefore, each will take all measures possible to make the arrows point in its direction. The job of the analyst is to understand this, explain the measures that have been taken, and foresee what measures may be taken.

Thus, the point of CCA is not to make once-and-for-all assumptions about parties, preferences and options and draw conclusions from them. A confrontation is dynamic, evoking emotions that drive parties to try to change any assumptions in their favor. The point of CCA for a party involved in a confrontation is to specify clearly where we need to take measures to:

- make arrows point our way; and

- thwart others' efforts to make arrows point their way.

When, as here, we are analyzing a situation we are not involved in, the point of CCA is to understand the dynamic, emotional forces that are at work, causing parties' beliefs, preferences and attitudes to change.

In our example:

- Emotions of defiance, together with reasons for suspecting or rejecting the supposed benefits of the other's position, will help each party to prefer the fallback to the other's position (tending to making one vertical arrow go its way).

- Threatening to make the fallback worse for the other party, and making such threats credible by expressions of hatred toward the other, will tend to make the other horizontal arrow point its way and keep vertical arrows from leaving the fallback.

- Expressions of goodwill and positive emotion will tend to keep vertical arrows from leaving one's own position.

Because CCA requires the user to think how parties will use emotion and creativity to change the assumptions initially put into the model, the method is one that requires users (eg, commanders and their staff) to "think outside the box" – ie, to think how their own force and OPFOR should/will react to the analysis, thus changing it. This is because the situations analyzed are (like war-fighting) essentially dynamic.

By formally representing their understanding of the current situation as an Options Board/Tug of War, users of CCA can check this understanding against incoming information. When an OPFOR message/action is at odds with the predictions of the model, either the model is wrong, or the message has been misinterpreted. Either way, assumptions must be reviewed and updated to maintain consistency between the commander's mental model and incoming intelligence. (Note: most of this incoming intelligence may actually be obtained by debriefing the commander himself.)
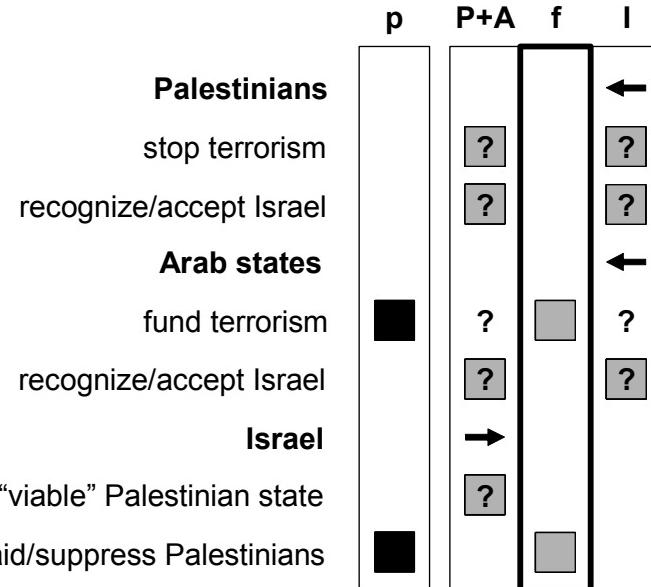
Figure 5: Options Board for a Middle East pre-intervention confrontation

Figure 5 provides a "real world" example of a pre-intervention confrontation in the Middle East, modeled using an Options Board. Palestinians are terrorizing Israel in an attempt to get it to accept a "viable" Palestinian state. Israel is raiding and suppressing the Palestinians.
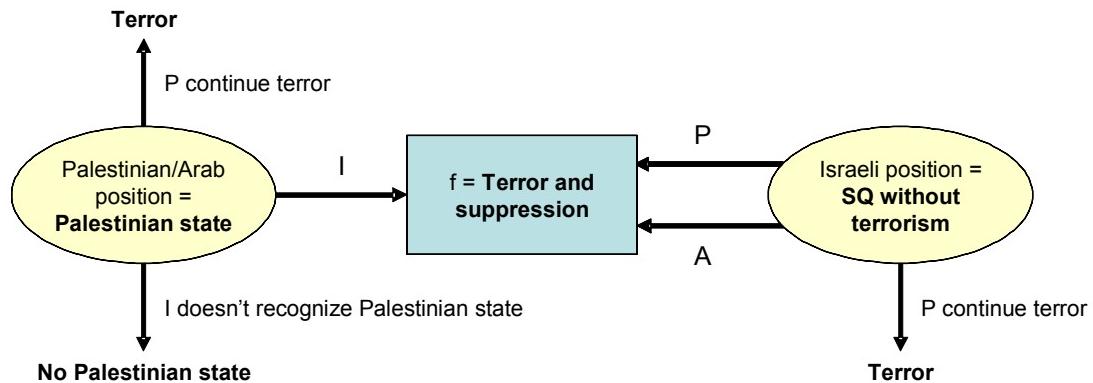
Figure 6: Tug of War for Middle East pre-intervention interaction

Figure 6 shows the Tug of War corresponding to Figure 5.

Clearly, emotions are running as CCA would predict.

On the Palestinian/Arab side, arguments and emotion in favor of a viable Palestinian state and against Israeli rule are produced, motivating:

- Preference for Terror and suppression rather than Status quo with no Palestinian state (to make right horizontal arrows point left).

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- Determination to make terror worse for Israel, so as to make Israel prefer Palestinian state to Terror and suppression (to try to make left horizontal arrow point left).

- Belief that a US-led intervention force will convince Israel that terror will cease and Israel will be accepted/recognized once there is a Palestinian state (removing the arrow going up from Palestinian State).

- Belief that a US-led intervention force will compel Israel to abandon settlements (removing the arrow going down from Palestinian state).

On the Israeli side, arguments and emotion in favor of belief that a Palestinian state will be used to continue attacking Israel are produced, motivating:

- Distrust of Palestinians, hence preference for Terror and suppression rather than Palestinian state (to make left horizontal arrow point right).

- Determination to make suppression worse for Palestinians and the status quo better, so as to make them prefer Status Quo (with no Palestinian state) to Terror and suppression (to make right horizontal arrow point right).

- Policy of fierce retaliation against terrorism plus amelioration of conditions when terrorism lessens (hopefully removing the arrow going down from Status Quo without terrorism).

These lists are far from exhaustive, but illustrate the concepts.

Collaborative Options Boards and Tugs of War

One way to make your position more likely to be accepted by the other party in a confrontation is to make it more attractive to them. This can lead to parties shifting positions till they reach a common position.

When and if parties agree on a common position, attention shifts to maintaining this agreement – ie, they switch from confrontation to *collaboration*. Collaboration does not mean that there are no problems. There remains the problem that parties may intend, or be suspected of intending, to defect from their agreement. To resolve this problem, parties that have reason to defect must be dissuaded from doing so through sanctions.

	p	a	rA	rB
Combatant A			→	
accept B's demands	■	?		?
fight				
Combatant B				→
accept A's demands	■	?	?	
fight				
Intervener				
intervene against A			?	
intervene against B				▨
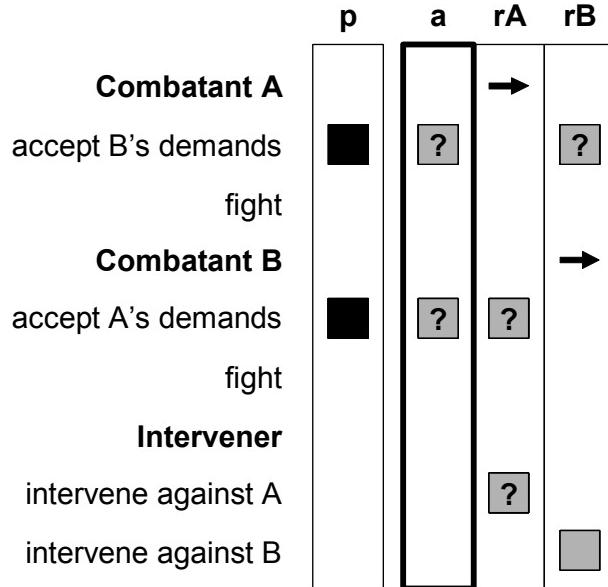
Figure 7: Options Board for a typical collaboration

Figure 7 illustrates a generic Options Board for a situation in which the parties have agreed to comply with a given future. Four futures are illustrated:

- p (present intentions) – the future according to current actions and intentions

- a (agreement) – the future parties have agreed to pursue

- rA – response to A's defection from agreement (defection is defined by A's choice of options, response by other's options)

- rB – response to B's defection from agreement (defection is defined by B's choice of options, response by other's options)

In a collaborative Options Board such as Figure 7, the defecting party in each response column is indicated by an arrow against its name. This party's selection of options represents its *defection*. The options selected by other parties represent their projected or threatened *response* to that defection.
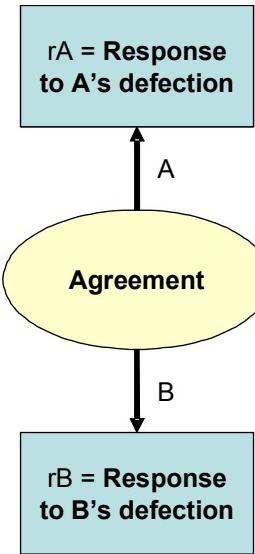
Figure 8: Tug of War for a typical collaboration

The Tug of War corresponding to Figure 7 is shown in Figure 8. Again, the Tug of War diagram allows the user to directly assess the strengths and weaknesses of this position. The user is prompted to try to answer the following two questions.

- Are the responses to each defection *credible*? If not, what measures are parties likely to take to try to make them so?

- Are they *adequate* to deter the corresponding defections? If not, what measures might parties take to try to make them so?
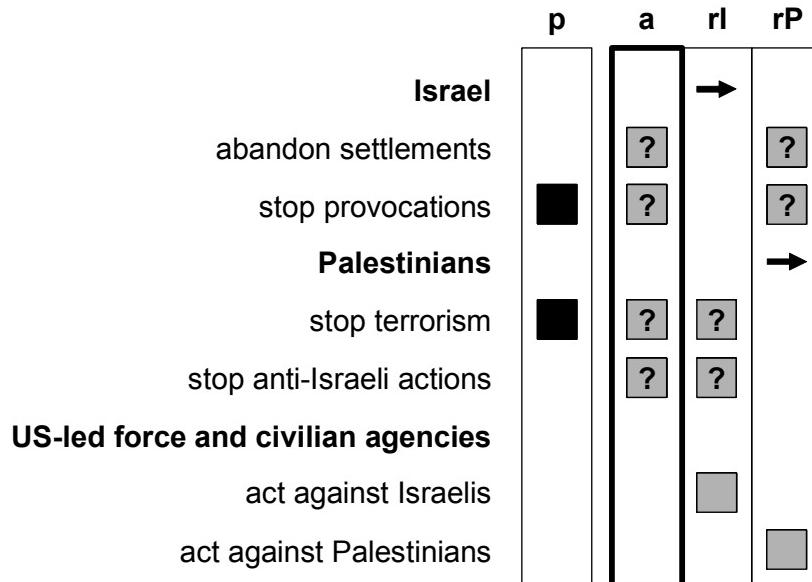
Figure 9: Options Board for a Middle East collaboration

Figure 9 provides a "real world" example of a collaborative interaction in the Middle East. In this example, Israel has agreed to abandon its settlements, and both sides have agreed to stop provoking/terrorizing one another.

Figure 10: Tug of War for a Middle East collaboration

The Tug of War for Figure 9 is shown in Figure 10. Again, this diagram allows us to directly assess the strengths and weaknesses of the position.

Measures of Merit for a C2CC system

We will now show how a C2CC system based on the use of Options Boards can incorporate MoMs that give valid estimates of progress toward non-compliant party compliance. As said, these are estimates of how close a force is to being able to exit from a stabilization and reconstruction theater.

Our MoMs are asserted to be valid in respect of content – ie, to measure what is required – rather than to be easy to measure. Reliability, consistency and ease of measurement are important, but first it is necessary to have a clear idea of what needs to be assessed. Our measures provide this—even though at the moment they rely very much on subjective judgment.

C2CC system framework

First, what is the shape of the projected C2CC system that provides the framework for the MoMs? It is as follows.

Each line commander and each relevant functional commander (ie, commanders responsible for PSYOPS, Public Information, CIMIC and Information Operations etc.) maintains an Options Board Information System (OBIS) to support CC planning and actions. A commander's OBIS consists of a set of Options Boards and associated Tugs of War that serve to model the commander's CC interactions with other parties.

The models are "clickable" – meaning that to click on any part of a model as it appears on a computer screen brings up a window giving relevant intelligence about that element. Thus, to click on a party, option or future gives the user a definition of that party, option or future and the assumptions that underlie the definition. To click on an arrow in a Tug of War gives a list of the arguments and emotions parties are using or are expected to use to maintain or change the direction of that arrow – as in the case of the arguments and emotions being used by Arabs and Israelis in the foregoing example.

How are the models constructed? A commander has trained staff (including, at HQ level, POLAD and INTEL at least) to prepare and update the models. But these staff do not work independently – at least, not when getting non-compliant party compliance, rather than war-fighting, is the commander's main effort. When this is the case, a line commander's staff work closely with the commander himself, simply because the models are used to plan his personal actions as a "shooter", so that he is necessarily involved in the assumptions made as well as the decisions taken. Indeed, he personally supplies many assumptions from the information he gets from one-to-one meetings with other parties.

What do the models support? They are of two kinds:

- Internal models, in which the commander appears as a separate party from other international coalition members, and plans a strategy to get them to cooperate.

- External models, in which the international coalition as a whole appears as a single party, planning how to get non-compliant parties to comply with its will.

The first kind of model supports the commander in planning how to get international coalition cooperation, the second supports joint civil-military planning carried out by the international coalition as a whole with the objective of getting non-compliant party compliance. This joint civil-military planning takes place in specially-convened sessions

of international coalition members, and is facilitated (for process, not content) by the commander's trained CC staff. This CC staff supply the computer hardware and software and update the models for both kinds of planning.

The models, of both kinds, used by different commanders are linked chronologically, vertically and horizontally, as follows.

- *Chronologically*: Models are continually updated due to new information or new developments (e.g., as a non-compliant party gives overt consent to our position, so that instead of modeling a confrontation we are now modeling a collaboration). As this happens, the old models are stored. This gives an audit trail of the progress of interactions that is later used for training, "what-if" analysis and lessons learned.

- *Vertically*. The position taken by a superior, as well as the superior's strategy for achieving that position, are inputs into the relevant models maintained by each subordinate. The way this works is as follows. Because of the above-discussed need for a practical model to be simple, the model used by a commander is a simple one. But the commander's staff has to take this simple model and make it complex (by adding parties and options to show the details that the model assumes) in order to see how to delegate missions to subordinate commanders. The mission delegated to each subordinate commander then consists of two kinds of model.

  o Models representing the staff's estimate of the interactions the subordinate must get into in fulfilling his superior's intent. These become the simple models used by the subordinate commander.

  o As background, in order to make his superior's intent clear, the relevant simple models used by the superior commander.

- The subordinate continually sends back to the staff an edited version of the first kind of model (his simple model), thus keeping them informed of the local circumstances he is encountering as he implements the superior's intent. This two-way communication continues and is updated as the campaign progresses.

- *Horizontally.* Relevant models maintained by other commanders are also inputs into a particular commander's models; that is, relevant simple models used by horizontally-linked commanders are continually communicated to a commander, keeping him informed of their positions and their strategies for achieving them. Conflicts between horizontally-linked models (reflecting lack of horizontal coordination) are either ironed out at their own level or, if necessary, adjudicated by higher-level staff or the higher-level commander.

The C2CC system also includes a range of reporting facilities, allowing "traditional" reports to be generated from the formal models. This is in recognition of two facts:

- not all commanders, at least initially, will be familiar with CC;

- not all commanders (eg, platoon commanders) will have direct access to the C2CC system.

CC Measures of Merit: OODA models and the High-Level measure

Having described how a C2CC system works in organizational terms, we will now describe in terms of two OODA (Observe, Orient, Decide, Act) loops how CC actions are managed.
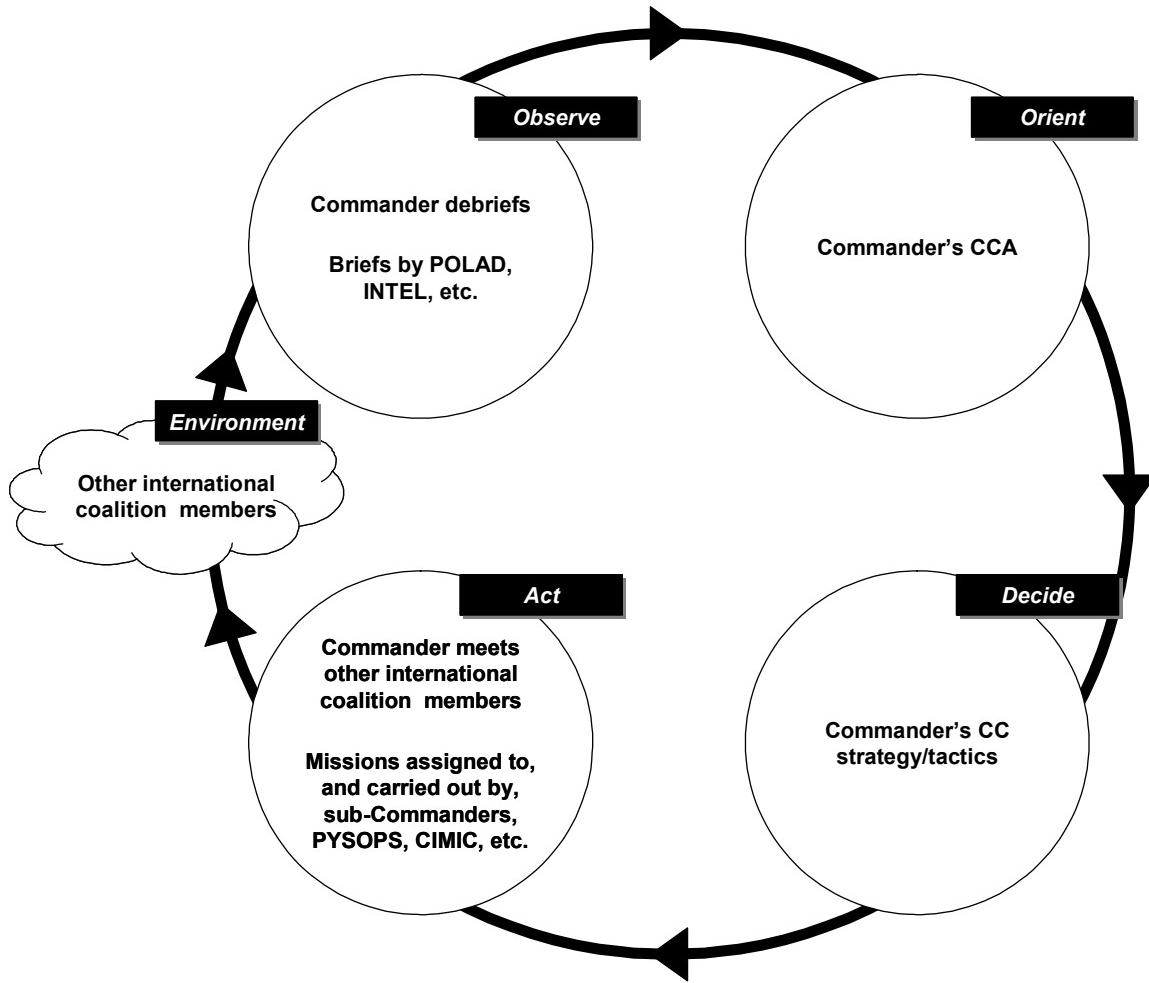
Figure 11: OODA loop for getting collaboration of coalition members

The loop in Figure 11 deals with how a commander gets the collaboration of other international coalition members in the task of confronting non-compliant parties. Though it applies to a commander at any level, our description will, in order to be concrete, focus on the case of a CJTF commander interacting personally with parties at his own level. Note that a commander's "personal" interactions may include those carried out by his immediate delegates.

The activities in Figure 11 are as follows.

- *Observe*: Intelligence gathered from subordinates is presented to the commander by his CCA staff. Other intelligence is obtained from the commander by debriefs carried out following his interactions with heads of relevant international organizations (eg, non-governmental organizations).

- *Orient*: CC analysis of this information is carried out by CCA staff and the commander.

- *Decide*: The commander decides on a CC strategy and tactics.

- *Act:* He implements this strategy through meetings with relevant international organizations, and through directives assigned to and carried out by sub-commanders.

The relevant environment acted upon is the set of international organizations whose collaboration is to be obtained and maintained.
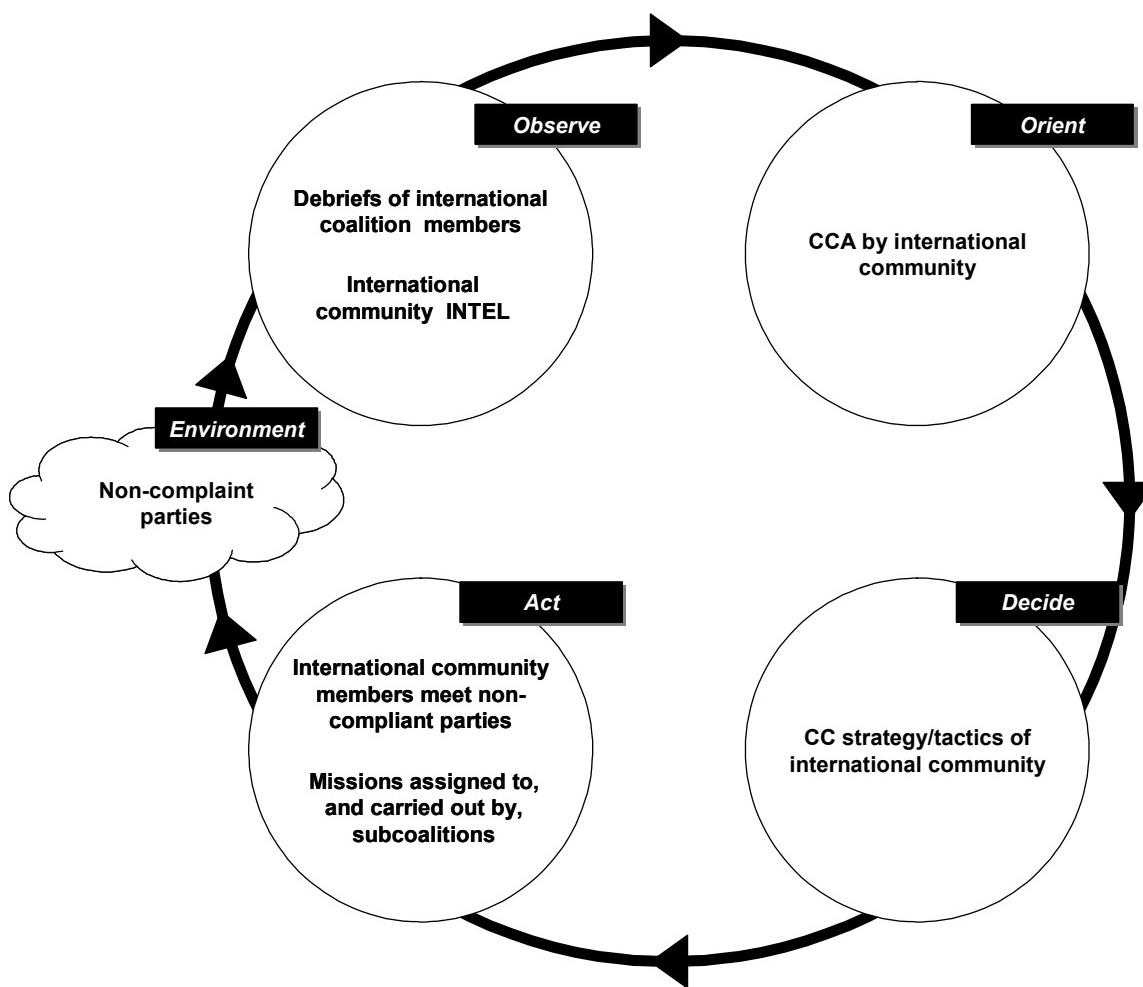
Figure 12: OODA loop for confronting non-compliant parties, then collaborating with them

Next, Figure 12 shows how the international community as a whole confronts non-compliant parties (when they are confrontational) and collaborates with them (when, as a

result of appropriate confrontation strategies, they have agreed to our position). Again, for concreteness, we describe operational-level activities. They are:

- *Observe*: Intelligence is presented to international community members (the commander together with relevant international organizations) from their own internal sources and from debriefs carried out on international community members following their interactions with possible non-compliant parties at theater level (eg, heads of government and national leaders).

- *Orient:* The international community analyzes this information in joint civil-military planning sessions chaired and led by the most relevant international member.

- *Decide:* The international community decides on its CC strategy and tactics.

- *Act:* The international community implements its strategy through coalition members' meetings with non-compliant parties and through directives to their subordinates.

The relevant environment acted upon is the set of non-compliant parties.

High-Level Measure of Merit

Having described how a C2CC is implemented both organizationally and conceptually, we will now define the High-Level Measure of Merit to be used. Being high-level, this is not defined for CC only, but is applicable to any operation and to the whole operation, not just one aspect of it. Our definition is:

> *Degree of implementation of the operational commander's end-state, consisting of achievement of a set of desired objectives.*

The operational commander's end-state and objectives will generally be as specified in his Concept of Operations (CONOPS).

Though this High-Level MoM is general in nature, we are, of course, particularly interested in the CC contribution to this High-Level MoM. We therefore define a CC High-Level MoM (*CCHLMoM*) as follows:

$$CCHLMoM = \sum_b w_b e_b \ ,$$

where,

- Summation is over a set of objectives b, the desired objectives of the end-state. Objective b has weight w_b, representing its degree of importance to the end-state. These weights sum to 1, and may be estimated, for example, using Saaty's Analytic Hierarchy Process (AHP). System Dynamics modeling, or other quantitative approaches, could also be employed in this task.

- The weight w_b is attached to a number e_b, varying between 0 and 1, representing the degree of CC effectiveness in achieving objective b.

Thus, we do not assume that attainment of the end-state depends solely on a force's CC effectiveness. This is merely what the *CCHLMoM* focuses on; it measures the contribution of CC effectiveness to achievement of the end-state. On the other hand, it is true that in stabilization and reconstruction operations, obtaining appropriate intentions on the part of non-compliant parties is vital for end-state objectives.

We intend to show, in the rest of this paper:

- How the weights w_b are estimated using AHP (though we repeat that other methods could be used here).

- How the coefficients e_b, representing CC Force Effectiveness in achieving each objective, are arrived at.

- How estimates of CC Effectiveness (as distinct from Force Effectiveness) are arrived at.

The distinction between Effectiveness and Force Effectiveness is that between "merit" (how appropriate were the actions taken to achieve a desired effect) and "outcome" (how far the effect was actually achieved). The difference between these is, of course, luck. Because of luck, one can be highly effective (Effectiveness high) and fail (Force Effectiveness low). Or one can take disastrously ineffective action (Effectiveness low), and succeed (Force Effectiveness high).

For example, a commander could have developed an innovative, comprehensive plan and executed it perfectly, only to have his troops thrown into disarray by a freak tornado not mentioned in any weather forecast. It would be unreasonable to expect him to have developed contingency plans for such an improbable event – yet the effect on the outcome would be devastating. Other, less extreme examples occur whenever commanders have inadequate information about probabilities—ie, all the time.

Illustrative scenario

At this point, in order to show how the *CCHLMoM* and other MoMs are applied in practice, we will describe a simplified scenario, based on experience with NATO exercises, in terms of which it will be possible to illustrate these concepts.

The scenario

There has been a long record of ethnic unrest and conflict between two countries, RED and GREEN, due largely to the presence of a RED minority in adjacent areas of GREEN. About a year ago border disputes escalated, resulting in frequent armed confrontations and exchange of fire in the border zone. The United Nations (UN) condemned both countries for violence and an arms embargo against both was imposed. Finally, RED, in response to increasing violence against RED minorities within GREEN, invaded the country "to free the suppressed RED population". A trade embargo against RED was imposed, necessitating an embargo implementation operation. Following a brief campaign, a cease-fire agreement was signed after RED's government had been replaced in a coup, and a UN Observer Mission to RED and GREEN (UNMIRG) was despatched.

Shortly after, UN-sponsored peace negotiations began, eventuating in the signing of a General Framework Agreement for Peace (GFAP) in RED and GREEN. Following a request to the UN/NATO, the UN Secretary General (SECGEN) and NATO SECGEN agreed to send a NATO-led CJTF to support implementation of the GFAP.

International political background

(Note: this material has been added to that based upon NATO exercises in order to make the example more realistic.)

Throughout the post-Cold War period of ethnic unrest and conflict between RED and GREEN, US sympathies have largely been with GREEN, seen as a pro-Western, democratic nation menaced by dictatorial regimes in RED. In opposition to this US view, liberal and left-wing opinion in Europe tended to blame GREEN for oppressing the RED population in South GREEN. This oppression is portrayed as the root cause of the conflict. These are generalizations, of course. Left-wing, non-mainstream opinion in the US has often taken the side of RED, while countries that depend upon US support have sided with GREEN.

When the UN High Commissioner for Refugees (UNHCR) and various non-government organizations became actively involved in the conflict between RED and GREEN, these divisions of opinion often led to GREEN human rights violations and acts of oppression being condemned by European and world opinion but excused or ignored by the US. Both sides, however, were shocked by the increasing violence. Hence, when border disputes and armed confrontations escalated in the border zone, the UN Security Council was able to pass resolutions denouncing both countries for violence. This apparent agreement in the international community covered up considerable disagreement about who was responsible. There was agreement, nevertheless, on imposing an arms embargo against both countries.

After September 11, 2001, the US government became strongly focused on the evil of terrorism, and was not prepared to tolerate the increase in activity by the RED Unification Front (RUF) in Southern GREEN. It strongly condemned RED government support for the RUF, and fully supported tough measures being taken by GREEN security forces. This led to the first vigorous disagreements, in the aftermath of 9/11, between the US, eager to condemn terrorism and European liberals and leftists who pointed to the need to eliminate its causes. In this case, they pointed to the oppression of the ethnic RED population, which, they argued, would be made worse by the strong anti-terrorist responses of GREEN police and army units.

Despite these disagreements, the UN Security Council was again unanimous in condemning RED for invading GREEN. During discussions of the resolution, France and Britain, joined by Germany and Russia, also spoke out against the violence perpetrated

against RED minorities within GREEN that supposedly triggered the invasion. The US, however, could not accept this viewpoint. It supported GREEN's measures to eliminate terrorism.

As the news came in that the capital of GREEN had been seized, international opinion swung more strongly against RED. A trade embargo against RED was imposed and an embargo implementation operation started on 18 May 2002. There was general relief among international supporters of the ethnic RED when a cease-fire agreement was signed on 11 September 2002.

A UN Observer Mission to RED and GREEN (UNMIRG) was quickly agreed; both the US and the supporters of the ethnic RED wished to see the cease-fire obeyed. When, however, UNMIRG reported evidence of GREEN retaliation against RED minorities, ethnic RED supporters were able to swing international opinion sufficiently for the UN Security Council to extend the embargo to GREEN.

The international community remained agreed on the necessity for RED to withdraw from the territory it had conquered. This may have encouraged the coup against the RED government, following which a draft peace agreement was announced, including a request to UN/NATO to support the implementation of the agreement. GREEN and its supporter, the US, wanted to make sure that RED withdrew. Supporters of ethnic RED rights hoped that UN/NATO involvement would prevent GREEN abuse of the RED.

Agreement within the UN and NATO continues to mask fundamental disagreements between US and other nations – particularly France, Russia and Germany – over the causes of the conflict and how it should be dealt with. The US position is that no concessions should be made to terrorism. The GREEN government and security forces should take all legal measures necessary to suppress the RUF. They should not negotiate with them or give them any right to represent ethnic RED. Instead, institutions should be negotiated with peace-loving ethnic RED leaders – who the US believes will step forward if given sufficient encouragement – to allow the ethnic RED to participate fully and equally in the government of South GREEN.

The Franco-German position – shared by the smaller European nations, but not by Britain – is that it is essential to negotiate with the RUF. The RUF, it is argued, have the support

of most ethnic RED, who see them as their protectors against GREEN violence and injustice. The RUF, it is believed, are prepared to be reasonable, wanting only to safeguard the human rights of their people. They are generally seen as heroic, leftist freedom fighters, rather than terrorists.

Britain is standing somewhat apart from this international argument. The European position is shared by most British voters, and held particularly strongly by members of the ruling party. However, the prime minister and cabinet are not prepared to openly oppose the US, seeing the role of Britain as being to form a bridge between Europe and the US. The British prime minister is therefore working behind the scenes to try to convince the US president to look more favorably upon negotiations with the RUF. He is searching for a compromise approach that will satisfy both sides.

COMINFOR's CONOPS

Before deploying his force, COMINFOR, the commander of NATO's Intervention Force, goes through an Operational Planning Process (OPP) at his regional HQ. This results in a CONOPS that specifies the following end-State and bbjectives.

- End-state: Military aspects of the GFAP are implemented and a safe and secure environment established for peaceful reconstruction.

- Objectives: This end-state will be ensured by meeting the following objectives either directly or through support to civil actors:

  o withdrawal of warring parties from extended Zone of Separation;

  o disarmament of armed ethnic civilian groups;

  o creation of structures to resolve conflicts peaceably and with respect for human rights;

  o aid for reconstruction; and

  o long-term political stability of theater.

Estimating Measures of Merit

Estimating the CC contribution to the end-state

The above objectives, taken from the CONOPS, are used in the formula for the CC High-Level MoM (*CCHLMoM*).

Recall that the formula is:

$$CCHLMoM = \sum_b w_b e_b$$

Thus, the objectives $b = 1, \ldots, 5$ mentioned in this formula are the five objectives listed above. The weights w_b attached to them are estimated, using the AHP, as follows.

	1	2	3	4	5
1 Withdrawal of forces	1.00	1.00	3.00	5.00	9.00
2 Long-term stability	1.00	1.00	1.00	5.00	9.00
3 Armed ethnic civilian group disarmament	0.33	1.00	1.00	5.00	9.00
4 Human rights	0.20	0.20	0.20	1.00	5.00
5 Reconstruction aid	0.11	0.11	0.11	0.20	1.00

Table 1: Results of pair-wise comparison

The relative importance of each pair of objectives is decided by asking: how many times more important is objective i than objective j in enabling INFOR to exit from the theatre? Table 1 provides the results.

	1	2	3	4	5	Weight
Withdrawl of forces	0.38	0.30	0.56	0.31	0.27	**0.37**
Long-term stability	0.38	0.30	0.19	0.31	0.27	**0.29**
Armed ethnic civilian group disarmament	0.13	0.30	0.19	0.31	0.27	**0.24**
Human rights	0.08	0.06	0.04	0.06	0.15	**0.08**
Reconstruction aid	0.04	0.03	0.02	0.01	0.03	**0.03**
Column sum	2.64	3.31	5.31	16.20	33.00	

Table 2: Weights derived via the AHP

After the relative importance of the objectives has been defined, each entry is divided by its column sum and the required weights obtained by averaging across rows. The final weights are shown in Table 2.

Estimating CC Force Effectiveness for each objective

This gives us estimates of the weights w_b in the formula. What of the coefficients e_b?

These represent the Force Effectiveness of CC actions in achieving each objective – ie, the degree to which achievement of CC objectives has contributed to the overall high-

level objective. The methods of estimating them are based upon the Options Boards maintained by CCA staff at each level of command.

Observe, first, that within the C2CC system we have described, there is, at each command, a CC common picture for that command. This is an actual or conceptual single Options Board, constructed by adding together all the options (with their parties) that appear in the different boards at that command. In the case of an operational commander, this CC common picture is, in effect, a CC common operational picture (COP) giving an overview of all CC interactions taking place in the theatre.

Now, our Measures of CC Force Effectiveness for each objective are defined in terms of the CC COP by estimating the effect on each objective of the difference between the future represented by parties' present intentions and that which represents the commmander's end-state. Thus, the Measure of CC Force Effectiveness for objective b is defined as:

$$e_b = MoCCFE_b = 1 - f_b(p,c),$$

where,

- p is the overall present intentions package, as defined in the CC COP

- c is the commander's end-state, as defined in the CC COP

- $f_b(y, z)$ is an estimate of the effect on objective b of moving from intentions package y to z – or from z to y. This effect may be estimated on a scale ranging from "very big" effect, scoring .9 to 1.0, through "big" and "small" effect to "very small" or "no" effect – scoring respectively .6 to .8, .3 to .5 and .2 to 0.

In estimating the effect $f_b(p, c)$, CCA staff must consider the different futures that can be predicted if intentions p or c are implemented.

The CC common operational picture; estimation of Force Effectiveness in the case of the illustrative scenario

To illustrate these estimates of CC Force Effectiveness in terms of our simplified scenario, we must first draw up illustrative examples of the Options Boards that are amalgamated to form the CC COP.

We will draw up six Options Boards, of four kinds:

- Operational-level models of two problems in getting RED and GREEN forces to withdraw from the Zone of Separation. These are the models that COMINFOR uses to plan his personal interactions with parties at his level.

- "Typical" tactical-level models of these two problems. These are models drawn up by staff to delegate missions to subordinate line commanders.

- An operational-level model of the problems in disarming armed ethnic civilian groups, safeguarding human rights and achieving a secure environment

- A "typical" tactical-level model of these problems.

The tactical-level models presented are "typical", rather than representing specific situations, because, in general, a whole set of tactical-level models are delegated from each of the commander's operational-level models. We take a typical member of each set.

As our focus is on the amalgamation of the models into a CC COP, we will not discuss in detail how they are used to plan and implement CC actions. We merely present them, with a few notes.

We also note in schematic form, for each model, the CC actions being taken – ie, the messages being sent to rectify possible weaknesses. We need to look at these messages, as we will see, in order to estimate CC Effectiveness (as distinct from CC Force Effectiveness).

We should point out that although the CJTF in our example is supposed to be assisted by a C2CC system, we are not assuming that its CC strategies are optimal. On the contrary,

we are assuming that they have realistic shortcomings. This will enable us to show how our MoMs point to these deficiencies and indicate how they may be remedied

	p	CO	rR	rG
COMINFOR			→	
enforce RED withdrawal			?	
enforce GREEN withdrawal				?
RED government leaders				
order withdrawal	■	?		�
GREEN government leaders			→	
order withdrawal	■	?	▩	
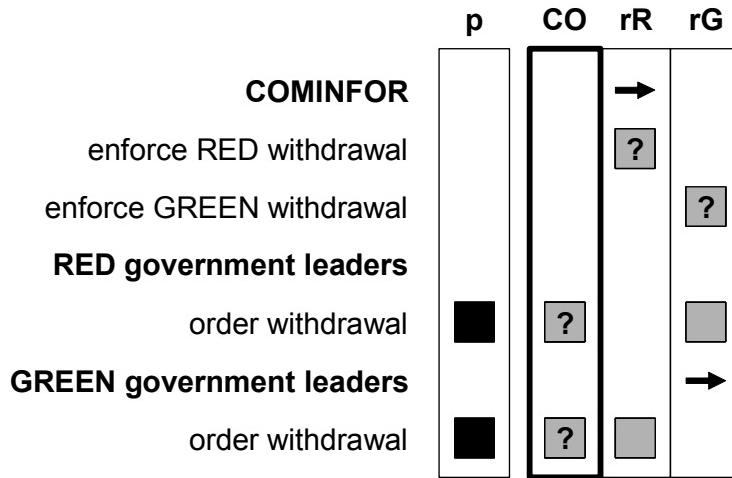
Board 1: Long-term withdrawal of forces: COMINFOR's operational-level model[2]

We begin with an operational-level model of the commander's problem in getting RED and GREEN forces to withdraw from the Zone of Separation (see Board 1). The commander's problem here is to get RED and GREEN government leaders (particularly the PM or President and the Minister of Defence) to give instructions to their forces to withdraw in accordance with the GFAP—the problem being that the commander suspects them of secretly giving instructions to delay withdrawal. This is, therefore, a "collaborative" model in which there is a common, agreed position—the column CO, in which both sides order withdrawal—and also *doubts*—options that, it is believed, may not be played in accordance with the common position. As before, doubts are indicated by question marks in the CO column; threatened responses to doubts are shown to the right.

Notes: COMINFOR is dealing with this problem without involving other members of the international community (which is a possible defect in his approach). Hence, the model represents COMINFOR's planning for his own actions, rather than for the international community as a whole. While the question marks in column CO represent possible doubts that government leaders will actually order withdrawal, those in rR and rG represent possible doubts on their part that COMINFOR will take firm action if they do

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[2] Future (column) p represents the present intentions of the parties, CO represents the compliance objective (agreement) and rR/rG represent COMINFOR's responses to RED/GREEN defections from the compliance objective.

not order withdrawal (note that this is firm action, not against failure of forces to withdraw – which manifests itself at tactical level – but against failure of government leaders to *order* withdrawal). These doubts point to possible weaknesses for COMINFOR to rectify. However, our estimate (appearing in column p) is that governments are at present actually ordering withdrawal.

Messages: These are summed up as: "Withdraw or [I'll enforce it] & [you'll be worse off]." Tone: collaborative.

Note: the brackets inserted in the message schema indicate the separate messages that the message is trying to make credible; government leaders were required to understand that if withdrawal did not take place, COMINFOR would take firm action that would make them worse off. The tone was collaborative ("let's agree on this so as to eliminate mistrust and misunderstanding").

	p	CO	f	R
COMINFOR				↔
enforce withdrawal on schedule				
RED government leaders		→		
order early withdrawal (keep heavy weapons)	■	?	▦	▦
order withdrawal on schedule		?		
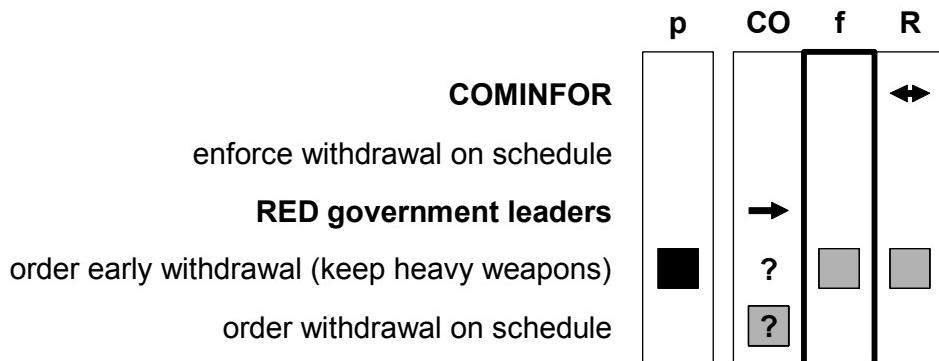
Board 2: Operational-level early withdrawal of RED forces in order to keep heavy weapons[3]

Next, Board 2 looks at a particular problem the commander is currently dealing with. RED units are withdrawing earlier than directed by INFOR, and in so doing are keeping heavy weapons that the GFAP requires them to surrender. This is partly INFOR's fault, as there has been a delay in assigning routes for withdrawal and sites for assembly of weapons.

Notes: Board 2 models the interaction over this issue between COMINFOR and RED government leaders. The problem, indicated by question marks, is that the governments

---

[3] Future (column) p represents the present intentions of the parties, CO represents the compliance objective (COMINFOR's position), R represents RED's position and f represents the fallback (which, is this case, is identical to RED's position).

prefer their units to withdraw early so as to keep their heavy weapons, and no message is being sent to deter them.

Messages: "If you order early withdrawal, [I will not respond] and [you'll be better off]". Tone: indifferent.

p	CO	f	NC
			← **INFOR unit**
appeal to non-compliant unit's superior		▪	
move closer to non-compliant unit		▪	
stop in/out movement		▪	
divide non-compliant unit		▪	
ensure electromagnetic quarantine		▪	
stop inessential supplies		▪	
harass non-compliant unit with noise, etc.		▪	
overfly threateningly		▪	
deliver indirect fire		▪	
use non-lethal agents		▪	
disarm non-compliant unit			
remove non-compliant unit's personnel			
attack with superior force			
Non-compliant unit	←		
withdraw on schedule	■	?	
resist			?

Board 3: Tactical-level withdrawal of forces[4]

Board 3 shows how COMINFOR is (through his CC staff) delegating missions to his tactical units in support of his intent for long-term withdrawal of forces. Note that, again, COMINFOR is delegating missions that involve the military only, not other members of the international community. He is specifying a list of measures – a "ladder of escalation"

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[4] Future (column) p represents the present intentions of the parties, CO represents the compliance objective (COMINFOR's position), NC represents the non-compliant unit's position and f represents the fallback.

– that units can employ (subject to requirements for superior authorization where necessary) to ensure withdrawal of non-compliant units. His present guidance to subordinate line commanders is that they should inform non-compliant units that if they do not withdraw they can expect the listed measures to be taken up to "use of non-lethal agents"; informing them of later measures is a message to be kept in reserve in case this threat seems to be insufficient.

Notes: The question marks again indicate possible weaknesses to be tackled. Will the non-compliant unit actually withdraw, even if they agree to do so? Might they not resist the measures taken under the fallback, if they are taken? To deter the latter kind of "defection" from the fallback, they must be assured that resistance will be met by INFOR attacking with superior force.

Message: "Withdraw or [we'll out-escalate you] and [you'll be worse off]." Tone: negative toward resistance, collaborative toward compliance.

Note that analysis of the fallback, showing the necessity for INFOR to make clear its intent to attack with superior force if non-compliant unit resists, is done in the same way as the collaborative analysis of a common position (Figure 7 and Figure 8): as in the collaborative case, the analysis consists of considering responses to possible "defections" and assessing their adequacy and credibility.
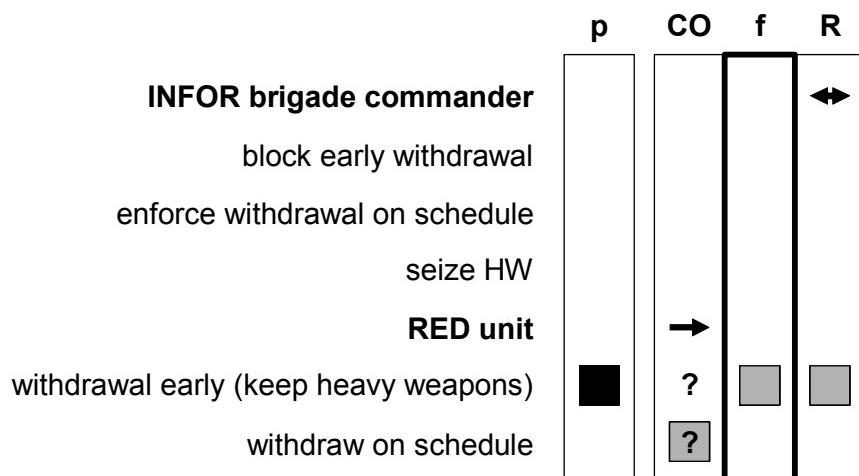
Board 4: Tactical-level early withdrawal of RED forces to keep heavy weapons[5]

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[5] Future (column) p represents the present intentions of the parties, CO represents the compliance objective (commander's position), R represents the RED unit's position and f represents the fallback.

Board 4 shows the Options Board that COMINFOR's CCA staff have sent to tactical commanders to support his intent regarding early withdrawal.

Notes: Board 4 models at tactical level the problem of early withdrawal modeled at theatre level in Board 2. It sets out the choices facing a brigade commander interacting with a non-compliant unit that is withdrawing early contrary to the GFAP. He might block the path of the withdrawing unit, use other means to enforce withdrawal on schedule, or even seize the heavy weapons being taken away by the non-compliant unit. However, none of these responses has been authorized. As in Board 2, the non-compliant unit is under no pressure to withdraw as requested by INFOR, rather than withdraw early.

Message: "Withdraw early and [we will do nothing] and [you'll be better off]". Tone: Indifferent.

The four Options Boards discussed so far have modeled problems to do with the withdrawal and separation of forces. Our last two boards model operational-level and tactical-level interactions over the linked problems of reconstruction aid, disarmament of armed ethnic groups and abuse of human rights.

Recall that the scenario, as we have sketched it, is that RED invaded Southern GREEN on the pretext that the RED population there were being abused by GREEN authorities as they tried to suppress the RED Unification Front (RUF), a terrorist organization seeking unification with RED. As RED forces withdraw, questions arise: will RED continue to support the RUF? Will the GREEN government, as it cracks down on the RUF, show that it respects human rights by supporting the UN Civil Police as they monitor GREEN security forces? Will reconstruction aid depend on parties' good behavior in these respects? And will COMINFOR agree to help suppress the RUF if necessary?

	p	CO	rG	rR	rGR
COMINFOR					
help suppress RUF					
act to stop human rights abuses					
Aid agencies					
aid GREEN	■	▣	▣	▣	▣
aid RED	■	▣	▣	▣	▣
GREEN government			→		→
crack down on RUF	■	▣		▣	▣
support UNCIVPOL		?		?	
RED government				→	→
support RUF	■	?	?	▣	▣

Board 5: Operational-level interaction over RED support for RUF and GREEN human rights abuses[6]

Note that in Board 5, COMINFOR and the aid agencies act as a single player, taking the same position and having an agreed response. They appear as separate parties in order to show their separate responsibilities under a common plan – a plan that has been drawn up through joint civil-military planning sessions.

Notes: The present intentions are that COMINFOR is refusing to help suppress the RUF or stop human rights abuses, pointing out that the GFAP lays this duty on the civil authorities; the aid agencies are preparing to help both GREEN and RED despite the fact that GREEN shows signs of disregarding UNCIVPOL admonishments and despite INTEL reports that RED (even though it denies it) is supporting the RUF. Thus the compliance objective – in which GREEN supports the UNCIVPOL and RED does not support the RUF – is overtly accepted by all parties, but covertly disobeyed by GREEN and RED. No sanctions are threatened. The result is the column rGR, the same as the present intentions.

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[6] Future (column) p represents the present intentions of the parties, CO represents the compliance objective (COMINFOR's position) and rG/rR/rGR represent COMINFOR's responses to RED/GREEN/GREEN+RED non-compliance.

Message (to RED): Support RUF and [you will get aid, INFOR will not help suppress RUF] and [you will be better off]. Tone: Supportive (in giving aid).

Message (to GREEN): Disregard UNCIVPOL and [you will still get aid, INFOR will not act against you] and [you will be better off]. Support UNCIVPOL and [INFOR will still not help suppress CUF] and [you will be worse off]. Tone: Supportive (in giving aid).

	p	CO	f	G
Tactical-level INFOR commander				←
assist removal of GREEN police chief				
UNCIVPOL representative				←
recommend removal	■		▨	?
OHR representative				←
recommend removal	■		▨	?
UN High Representative				
support removal	■		▨	?
order removal				
GREEN police chief		→		
abuse RED population	■	?	▨	▨
resist removal	■		▨	
GREEN government		→		
agree to removal				
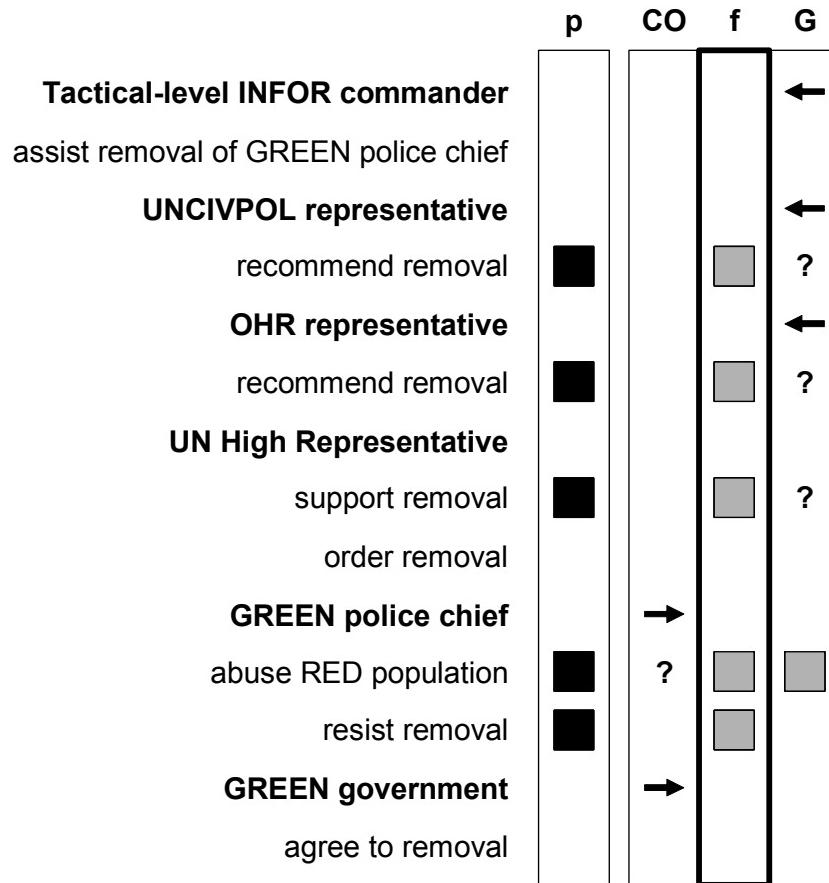
Board 6: Tactical-level problem of GREEN human rights abuses[7]

Board 6, our last board, is one of the boards by which operational-level members of the international community, both military and civilian, delegate missions to their tactical-level counterparts. This board is, as we have said, discussed and edited in joint civil-military planning sessions that take place at tactical level. The software and hardware by which the board is displayed and by which information on it is updated is maintained by the military, and a CCA-trained staff officer is responsible for facilitating the sessions.

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[7] Future (column) p represents the present intentions of the parties, CO represents the compliance objective (commander's position), G represents the GREEN government's position and f represents the fallback.

The situation the international community is discussing is that a GREEN police chief is abusing the RED population. The UNCIVPOL representative can recommend his removal and the local Office of the High Representative (OHR) representative can back it. With this backing, it must go up to the UN High Representative for his support. Even if he supports it, however, the removal will not be implemented unless either the GREEN government agrees to his removal and orders it or INFOR carries it out forcibly. Otherwise, the police chief can successfully resist removal and continue abusing RED – thereby making himself popular with the majority GREEN population.

Note that, although the UN High Representative and the GREEN government are players at operational level rather than at the tactical level where this civil-military planning meeting is taking place, they are included in the model because their responses to what is decided are important and can be influenced by international community members present. The same is true, of course, of COMINFOR. However, the tactical-level INFOR commander interprets the mission given to him by COMINFOR as requiring him to refuse to help remove the police officer, as this would amount to "taking action against human rights abuses". This, therefore, is a constraint that has to be accepted by the meeting.

The meeting judges (possibly through informal contact) that the UN High Representative will wish to back a recommendation to remove the police chief but that the GREEN government will prefer to defy it. However, despite the fact that it is likely to be defied, the international community as a whole prefers to make the recommendation.

Notes: The GREEN position is that there should no recommendation to remove the police chief, but if there is such a recommendation, GREEN parties prefer the fallback (successful resistance) to removal. As this is also preferred by the international community to the GREEN position, it is likely to happen, and is the p future.

Message (to GREEN parties): "If you don't stop human rights abuse, [we will recommend removing the police chief], but [you can successfully resist this]." Tone: Indignant and reproving.

Forming the common operational picture and estimating Force Effectiveness

Having modeled these interactions, we now put the six Options Boards together to form a COP in which CCA staff compare overall present intentions (p) with the overall compliance objective (CO). From this comparison they obtain an assessment of CC Force Effectiveness.

	p	CO	
COMINFOR			
enforce RED withdrawal			
enforce GREEN withdrawal			
RED government leaders			
order withdrawal	■	▢	
GREEN government leaders			
order withdrawal	■	▢	

Board 1: Long-term withdrawal of forces: COMINFOR's operational-level model

	p	CO	
COMINFOR			
enforce withdrawal on schedule			
RED government leaders			
order early withdrawal (keep heavy weapons)	■		×
order withdrawal on schedule		▢	×

Board 2: Operational-level early withdrawal of RED forces in order to keep heavy weapons

	p	CO	
INFOR unit			
appeal to non-compliant unit's superior			
move closer to non-compliant unit			
stop in/out movement			
divide non-compliant unit			
ensure electromagnetic quarantine			
stop inessential supplies			
harass non-compliant unit with noise, etc.			
overfly threateningly			
deliver indirect fire			
use non-lethal agents			
disarm non-compliant unit			
remove non-compliant unit's personnel			
attack with superior force			
Non-compliant unit			
withdraw on schedule	■	▢	
resist			

Board 3: Tactical-level withdrawal of forces

	p	CO	
INFOR brigade commander			
block early withdrawal			
enforce withdrawal on schedule			
seize HW			
RED unit			
withdrawal early (keep heavy weapons)	■		×
withdraw on schedule		▢	×

Board 4: Tactical-level early withdrawal of RED forces to keep heavy weapons

	p	CO	
COMINFOR			
help suppress RUF			
act to stop human rights abuses			
Aid agencies			
aid GREEN	■	▢	
aid RED	■	▢	
GREEN government			
crack down on RUF	■	▢	
support UNCIVPOL		▢	×
RED government			
support RUF	■		×

Board 5: Operational-level interaction over RED support for RUF and GREEN human rights abuses

	p	CO	
Tactical-level INFOR commander			
assist removal of GREEN police chief			
UNCIVPOL representative			
recommend removal	■		×
OHR representative			
recommend removal	■		×
UN High Representative			
support removal	■		×
order removal			
GREEN police chief			
abuse RED population	■		×
resist removal	■		×
GREEN government			
agree to removal			

Board 6: Tactical-level problem of GREEN human rights abuses

Board 7: COP comparing present intentions with the compliance objective

The resulting COP is shown in Board 7. In a real-life example, the two columns will of course be much larger than these. Nevertheless, the two columns must be compared as a whole, as effects are not additive over the options: there are bound to be interactive effects. Methods of decomposition (eg, focusing on the subset of interactions relevant to a given objective) may be used to take advantage of areas between which there is little interaction.

In any case, it is useful to note where the columns differ. This is indicated in Board 7 using crosses.

	Boards	Very big	Big	Medium	Small	Very small	No effect
Withdrawl of forces	2,4				X		
Long-term stability	5,6		X				
Armed ethnic civilian group disarmament	5	X					
Human rights	5,6	X					
Reconstruction aid	5						X
		0.9	0.7	0.5	0.3	0.1	0

Table 3: Effects of differences between present intentions (p) and compliance objective (CO) on each high-level objective

After examining the difference between the two columns, staff judge the effect of this difference on each high-level objective. They do this by filling out Table 3 where:

- The column titled "Boards" lists the Options Boards (e.g. Board 1-Board 6) that impact each objective. This reduces the effort required to identify the relevant differences between the present intentions and the compliance objective.

- The cells marked with crosses specify the size of the effect—from "very big" to "no" effect.

The figures below the columns show the estimated quantitative effect, on a scale of 0 to 1, associated with each size of effect described at the top of the column. Note that a small difference in this table is desirable, as it means that the present intentions are close to the compliance objective in areas where it matters for that particular end-state objective. Thus, there is no difference between the present intentions and the compliance objective in relation to the reconstruction aid objective, for the simple reason that objectives were completely achieved in relation to reconstruction aid (see Board 5). Hence, the difference between the present intentions and the compliance objective is assessed as having zero effect on the high-level reconstruction aid objective.

End-state objectives were also very well (although not perfectly – as heavy weapons are being retained) achieved in relation to withdrawal of forces, leading to a small effect of the present intentions/compliance objective difference on this high-level objective. However, in relation to the long-term stability objective, armed ethnic civilian group disarmament and human rights, end-state objectives were not at all well met (as a result of continued support for terrorism and abuse of civilians). Consequently the effect of the difference between the present intentions and the compliance objective on these high-level objectives was assessed as being large.

High-level objective (b)	MoCCFE (e_b)
Withdrawal of forces	0.7
Long-term stability	0.3
Armed ethnic civilian group disarmament	0.1
Human rights	0.1
Reconstruction aid	1

Table 4: Measures of CC Force Effectiveness

From Table 3 staff derive the following Measures of CC Force Effectiveness for each end-state objective – ie, they derive the coefficients e_b used to estimate the current CC contribution to the attainment of COMINFOR's end-state and consequent exit from the theater. These coefficients are listed in Table 4.

High-level objective	MoCCFE (e_b)	Weight (w_b)	CCHLMoM ($\sum_b w_b e_b$)	Deficiency ($w_b(1-e_b)$)
Withdrawal of forces	0.7	0.37	0.259	0.11
Long-term stability	0.3	0.29	0.087	0.20
Armed ethnic civilian group disarmament	0.1	0.24	0.024	0.27
Human rights	0.1	0.08	0.008	0.07
Reconstruction aid	1.0	0.03	0.030	0.00

Table 5: CC High-Level MoMs for each objective

Using these coefficients, staff compute the CC High-Level MoM for each objective, as shown in Table 5.

This is on a scale of 0 to 1. The 41% score indicates that the CJTF is still a considerable way from creating the conditions for exit. The biggest contribution to the 41% score is

made by Force Effectiveness in achieving withdrawal and separation of forces. The next biggest contribution, though rather small, is made by Force Effectiveness in achieving long-term stability. The least contribution of all is made by Force Effectiveness in reconstruction aid, despite objectives in this area being fully achieved. This is because staff officers give this end-state objective a low weight in estimating COMINFOR's CC High-Level MoM, as it was felt that INFOR could exit safely without much aid being given.

The last column (deficiency per objective) shows where improvements need to be made, taking into account both the importance of the objective and the room for improvement in achieving it. It informs COMINFOR that armed ethnic civilian group disarmament and long-term stability are the objectives on which he needs to focus.

Referring back to Table 3, COMINFOR can see that in order to focus on these objectives, he needs to improve CC effectiveness in two interactions – those represented by Board 5 and Board 6. We turn now to how CCA staff estimate CC effectiveness in each interaction.

Measures of CC Effectiveness

While our measures of CC Force Effectiveness measure actual outcomes – the degree to which the overall compliance objective has been made the present intention, with respect to the effect on each objective of failing to make it so – the staff's measures of CC Effectiveness measure, instead, how effective were the actions planned and taken to achieve desired outcomes.

The point is that good plans well executed may not always result in good outcomes, due to other factors intervening (ie, bad luck). Vice versa, poor plans badly executed may result in good outcomes, due to luck. Despite this, of course, we must seek to plan and act well. The point is well made by two quotations:

> ***Ecclesiastes***: *"The race is not to the swift nor the battle to the strong, but time and chance happeneth to them all."*

> ***Damon Runyon***: *"It may be that the race is not to the swift nor the battle to the strong, but that is the way to bet."*

CC Command Effectiveness

In relation to CC, two kinds of effectiveness can be defined. The first is CC Command Effectiveness, consisting of how far, and how importantly, the *actual objectives* set by commanders in each interaction differ from the compliance objectives that they *should* have set.

CC Command Effectiveness, in the case of a CJTF commander, is a measure of how appropriately that commander has set objectives for the CC interactions taking place in the theater, both at theater (operational) level (setting objectives for himself) and at local (tactical) level (setting objectives for his subordinate line commanders).

Now this kind of effectiveness is undoubtedly important. It is, however, impossible for it to be assessed by staff officers in the course of operating a C2CC system. It would require them to substitute their own judgments either for their commander's judgment (in the case of Options Boards representing his personal interactions at his own level) or – still more impossibly – for their own judgments (in the case of Options Boards representing the missions they are delegating to subordinate commanders). Thus, Command Effectiveness can only be assessed either after the event, in the course of lessons learned, or concurrently by an independent monitoring team reporting to a higher level of command.

For these purposes, it is useful to see how to estimate CC Command Effectiveness. A Measure of CC Command Effectiveness (*MoCCCE*) for objective *b* may be defined as follows:

$$C_b = MoCCCE_b = 1 - f_b(a,c),$$

where,

- *a* is the "actual" overall compliance objective, defined within the COP in the same way as we define the overall compliance objective when assessing CC Force Effectiveness.

- *c* is the "correct" overall compliance objective – the one that should have been set (possibly with the benefit of hindsight).

- $f_b(a, c)$ is, as before, an estimate of the effect on objective b of moving from a to c – estimated on a scale ranging from "very big" effect to "no" effect and scored by looking at the different futures that could be predicted if intentions a or c were implemented.

Now, C_b equals 1 if overall actual objectives a coincide with the overall compliance objective c. In the case of our illustrative example, we shall assume, for simplicity, that this is the case. The alternative would be to imagine two scenarios – one assumed by the CJTF, the other, different from the first, the actual one. Though realistic, this is too complex for an illustrative example.

CC Tactical Effectiveness (MoCCTE)

The second kind of CC effectiveness to be measured is CC Tactical Effectiveness (*MoCCTE*). This is a measure of the effectiveness of the CC tactics employed in each interaction – where CC tactics are considered effective insofar as they exert pressure to bring about the commander's actual objective – which we are here assuming to be the same as the "correct" compliance objective for that interaction.

(Recall that this assumption—that the actual objective is the correct one – is the assumption necessarily made by CCA staff operating a C2CC system. Otherwise, they would either be substituting their own judgment for their commander's – in the case of his personal interactions – or assuming their own, simultaneously-made judgments to be incorrect – in the case of missions they are delegating to subordinate commands.)

CC Tactical Effectiveness in each interaction is estimated by taking the following steps.

Step 1: Analyze the model of each interaction for the CC dilemmas that the individual commander or international community coalition needs to address to achieve success.

Dilemmas are represented, in the Options Board model, by arrows or question marks. When faced by a dilemma, decisions must be made concerning *what* message to send, to *whom*, and *how*. These are decisions about the *arguments* and *evidence* to be presented to other parties in order to bring about or maintain desired changes in their preferences and beliefs, and how to communicate such arguments and evidence. The result is a message

sent to other parties by some means or other – eg, by meetings, speeches, or concrete actions such as deployment of forces or destruction of assets.

Step 2: For each dilemma, estimate, on a scale of 0 to 1, the effectiveness (probability of success) of the message (or messages) being sent to resolve, or exacerbate, that dilemma – ie, to bring about or maintain the desired change.
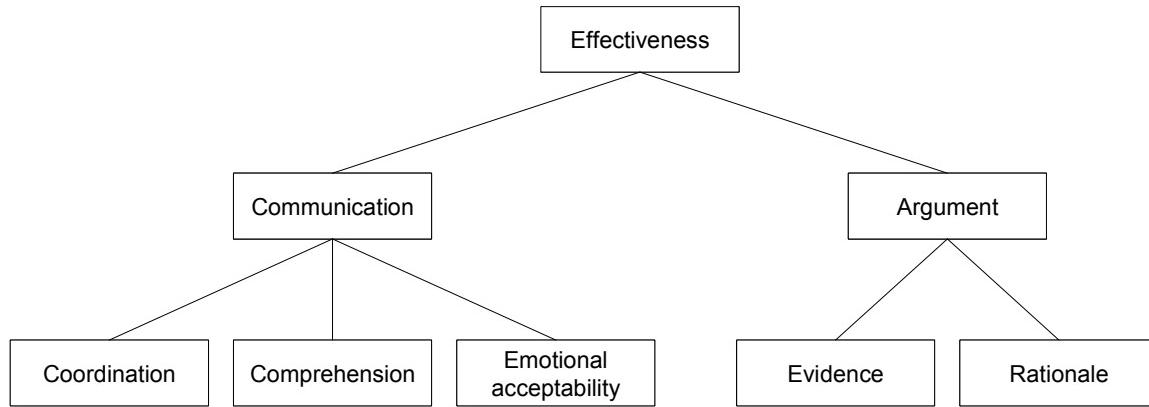

Figure 13: Factors determining the effectiveness of a message

Now, in order to carry out Step 2, an estimate is required of the factors that make a message effective (likely to succeed). How is this done? As set out in Figure 12, we proceed as follows.

Effectiveness (*Eff*) is estimated as the product of two factors:

- **Communication** (*Comm*): the probability that it will be received and accepted.

- **Argument** (*Arg*): the probability that the message will, if received and accepted, have the desired effect.

We have, in other words:

Eff = Comm × Arg.

What does *Comm* depend upon? It may be estimated as the product of three factors:

- **Coordination**: (*Coord*): The inverse (obtained by subtracting the given probability from 1) of the probability that the message will be dismissed due to lack of consistency between messages received from different sources connected to the sender – eg, from different levels of command or partners in the coalition.

- **Comprehension** (*Compr*)*:* the probability that the message will be understood, given the language and culture of the recipient.

- **Emotional acceptability** (*Emote*): The inverse of the probability that the message will be rejected because its emotional tone is inconsistent with its content – as, for example, when a collaborative message has a sneering, triumphant tone or a threat is delivered nervously and hesitantly.

We write:

Comm = Coord × Compr × Emote.

Next, What does *Arg* (the probability that the message will, if received and accepted, have the desired effect) depend on? It may be estimated as the product of two further factors:

- **Evidence** (Evid): probability that, if received and accepted, the message will be believed. This depends upon proof existing or being given, as necessary, for facts cited in the Rationale (see below) – for example, that we possess the capability and will to deliver aid or inflict damage by bombardment.

- **Rationale** (Rat): probability that, if received, accepted and believed, the message will have the desired effect. Rationale depends upon the reasons given for the desired change in beliefs/preferences – eg, that a threat to withhold aid will have such-and-such ill effects, sufficient to make the recipient worse off if it defies the threat and therefore loses aid.

We write:

Arg = Evid × Rat.

In all, therefore, the effectiveness of the attack on dilemma *d* in interaction *i* may be estimated as the product:

$E_{id} = Comm_{id} \times Arg_{id} = (Evid_{id} \times Rat_{id}) \times (Coord_{id} \times Compr_{id} \times Emote_{id}).$

This analysis was checked by a literature search to find what aspects of a message psychologists consider important in making it credible and effective. Although no one

psychological theory seems to encompass all these factors, each of them is covered by one or another theory.

A Measure of CC Tactical Effectiveness (*MoCCTE$_i$*) for a particular interaction *i* is now obtained as follows:

$$MoCCTE_i = E_i = \prod_d E_{id} \; .$$

Estimating CC Tactical Effectiveness

We now illustrate, using our simplified scenario, a practical method for CCA staff to estimate tactical effectiveness E_i in each interaction *i*.

	Dilemma 1: "We'll punish and out escalate you."							Dilemma 2: "You'll be worse off."					
	Tone: Supportive												
	Improvement in this aspect is…							*Improvement in this aspect is…*					
Aspect of message	Essential for CO	Very desirable for CO	Desirable for CO	Helpful for CO	Unnecessary for CO	Effectiveness		Essential for CO	Very desirable for CO	Desirable for CO	Helpful for CO	Unnecessary for CO	Effectiveness
Evidence					✕	1						✕	1
Rationale					✕	1					✕		0.95
Coordination					✕	1						✕	1
Comprehension					✕	1						✕	1
Emotional acceptability					✕	1						✕	1
Message effectiveness						1							0.95
Interaction *MoCCTE*													0.95

Assessment 1: Operational-level interaction over long-term withdrawal of forces

Begin with Board 1, representing COMINFOR's personal interactions with government leaders over long-term withdrawal of forces. To arrive at Assessment 1, the CCA staff have proceeded as follows:

- They have first written a message schema in which the two dilemmas in this interaction correspond to two bracketed parts of the schema.

- For each bracketed part of the schema, they have examined the messages being sent and assessed five aspects of the messages: Evidence, Rationale, Coordination, Comprehensibility and Emotional acceptability.

- For each aspect, they have made a judgment whether improvement in that aspect is "essential", "very desirable", "desirable", "helpful" or "unnecessary" in order to achieve the compliance objective. They have marked the table accordingly. (For improvement to be "unnecessary" is, of course, the best assessment; for it to be "essential" is the worst.)

The table has then automatically generated the *MoCCTE* for each dilemma in the interaction. It is 1 (a perfect score) for the first dilemma, 0.95 (a good score) for the second. The overall *MoCCTE* for this interaction is the product of these – 0.95.

Dilemma 1: "I will not respond."
Dilemma 2: "You'll be better off."

Tone: Indifferent

	Improvement in this aspect is…					
Aspect of message	Essential for CO	Very desirable for CO	Desirable for CO	Helpful for CO	Unnecessary for CO	Effectiveness
Evidence						
Rationale	✗					0
Coordination						
Comprehension						
Emotional acceptability						
Message effectiveness						0
Interaction *MoCCTE*						0

Assessment 2: Operational-level interaction over early withdrawal of RED forces

Board 2 is assessed in Assessment 2. This analysis is straightforward as *no* messages are being given attacking the dilemmas. Now, to send "no message" when the situation requires one to be sent does, in fact, send a fairly clear message – viz, that one will not respond. Hence no rationales are being advanced, leading to judgments that improvement in this aspect was "essential". This means that no further entries are needed and CC Effectiveness for both dilemmas and for the whole interaction is zero.

Note the following:

- What is happening at this point is that the force has been caught out in regard to early withdrawal – which we recall is a problem largely caused by its own delays in assigning routes, etc. – and has not yet decided how to respond. Hence the score of zero for effectiveness, arising from the message they are sending *by not sending a message*. Note that it is important for the CCA staff to ask themselves what message they are sending in this way – ie, by not sending a message.

- On the other hand, a zero score is not incompatible with success – ie, achievement of the compliance objective. It merely means that success, if it occurs, owes nothing to CC Effectiveness.

Dilemma 1: "We'll punish and out escalate you."   **Dilemma 2**: "You won't like it."

Tone: Cold

Aspect of message	Improvement in this aspect is…						Improvement in this aspect is…					
	Essential for CO	Very desirable for CO	Desirable for CO	Helpful for CO	Unnecessary for CO	Effectiveness	Essential for CO	Very desirable for CO	Desirable for CO	Helpful for CO	Unnecessary for CO	Effectiveness
Evidence					✕	1					✕	1
Rationale					✕	1					✕	1
Coordination					✕	1					✕	1
Comprehension					✕	1					✕	1
Emotional acceptability				✕		0.95				✕		0.95
Message effectiveness						1						0.95
Interaction *MoCCTE*												0.9

Assessment 3: Tactical-level interaction over early withdrawal of forces

Assessment 3 (of the interaction represented by Board 3) is the next assessment produced by CCA staff. It gives an excellent score for tactical-level effectiveness in achieving withdrawal of forces.

Dilemma 1: "We will do nothing."

Dilemma 2: "You'll be better off."

Tone: Indifferent

Aspect of message	Essential for CO	Very desirable for CO	Desirable for CO	Helpful for CO	Unnecessary for CO	Effectiveness
			Improvement in this aspect is…			
Evidence						
Rationale	✕					0
Coordination						
Comprehension						
Emotional acceptability						
Message effectiveness						0
Interaction *MoCCTE*						0

Assessment 4: Tactical-level interaction over early withdrawal of RED forces

Assessment 4 (of the interaction represented by Board 3), like its operational counterpart Assessment 2, gives a zero score for effectiveness in stopping early withdrawal of RED forces.

Dilemma 2: "You'll be better off."
Dilemma 4: "You'll be better off."
Dilemma 6: "You'll be worse off."

Tone: Supportive (in giving aid)

Aspect of message	Essential for CO	Very desirable for CO	Desirable for CO	Helpful for CO	Unnecessary for CO	Effectiveness
				Improvement in this aspect is…		
Evidence						
Rationale	✕					0
Coordination						
Comprehension						
Emotional acceptability						
Message effectiveness						0
Interaction *MoCCTE*						0

Assessment 5: Operational-level interactions over RED support for RUF, and over GREEN human rights abuses

Assessment 5, of operational-level effectiveness in stopping RUF activity and human-rights abuses (see Board 5), is also given an overall score of zero, since the threats and promises to RED and GREEN are judged to be totally inadequate.

	Dilemma 1: "We'll request your removal."						Dilemma 2: "You'll be worse off."					
	Improvement in this aspect is…						Improvement in this aspect is…					
Aspect of message	Essential for CO	Very desirable for CO	Desirable for CO	Helpful for CO	Unnecessary for CO	Effectiveness	Essential for CO	Very desirable for CO	Desirable for CO	Helpful for CO	Unnecessary for CO	Effectiveness
Evidence					✕	1					✕	1
Rationale					✕	1		✕				0.5
Coordination				✕		0.95		✕				0.5
Comprehension					✕	1					✕	1
Emotional acceptability					✕	1					✕	1
Message effectiveness						0.95						0.25
Interaction *MoCCTE*												0.24

Assessment 6: Tactical-level interactions over GREEN human rights abuses

The last assessment, Assessment 6 (see Board 6), made by CCA staff is perhaps the most interesting. The threat to GREEN (to recommend removal of the police chief, without removal being implemented) is judged to be totally credible – hence the score of 0.95 for the first dilemma.

However, its adequacy (in making the GREEN parties worse off) is doubted – partly because of its rationale (the GREEN parties might prefer to defy the international community on this issue) and partly because of lack of coordination between, on the one hand, the UN and OHR (parties that are threatening to recommend removal) and INFOR (the party that is not threatening to implement removal). This results in a score for the second dilemma of 0.25.

The overall score for the interaction is 0.24.

How the Measures of Merit are used

COMINFOR, assisted by CCA staff, use the MoMs we have discussed for two purposes – to decide on the *where* and *how* of needed improvement in CC effectiveness.

- **Where we need to be more effective.** As we have seen, Table 1 and Table 4 direct command attention to where improvement is needed.

  o The last column of Table 4 shows the objectives that need to be focused on, taking into account both the importance of each objective for the overall end-state and the degree to which each objective is already being attained.

  o Table 3 shows where (ie, in which interactions) effectiveness must be increased in order to achieve each objective.

- **How to become more effective where we need to be.** Having decided where we need to be more effective, the measures of effectiveness for each interaction are a guide to how to increase our effectiveness in those interactions.

Of course, the measures of effectiveness do not show in any mechanical way how to make improvements. Thinking "outside the box" is needed, as emphasized in the discussions of CCA in early sections.

In particular, interactive effects have to be looked for and taken into account. For example, increasing effectiveness in the interaction represented by Board 5 may require credibly threatening to withhold aid, which in turn may require actually withholding aid in order to make the threat credible. Hence, present intentions may have to be altered to include withholding aid, with negative effects on the aid objective and consequent negative effects on the overall *MoCCFE*. Points to note are:

- This is an example of "taking one step back in order to take two steps forward". It remains true that upon attaining the overall compliance objective, CC Force Effectiveness will be 100% in all objectives, including aid. If it is believed that the overall compliance objective will not be attained, it is incumbent upon the commander to modify this objective.

- Tactics such as withholding aid are agreed in meetings of the joint civil-military planning group, where CCA is used to make the interactive effects clear.

In addition to being used to evaluate "live" planning and action, the MoMs can be applied historically (e.g. to determine where a particular interaction went wrong) or to compare alternative "commander as shooter" C2 processes.

Summary

This paper has outlined the concept of a C2CC system – ie, a C2 system to assist in the planning an execution of "commander as shooter" missions. These "commander as shooter" missions are essential to the attainment of exit conditions in stabilization and reconstruction operations.

A set of MoMs have been introduced, and illustrated though a realistic case-study. It has been shown how these can be used to monitor the effectiveness of strategies designed to change the intentions of non-compliant parties, and identify weaknesses in these strategies.

References

1. Smith E. **Effects Based Operations: Applying Network Centric Warfare in Peace, Crisis and War**. Washington, DC: CCRP Publication Series. 2003.

2. Baan A, Howard N, Tait A, **"COM as Shooter" - Operational Planning using C2 for Confronting and Collaborating**. Proceedings of the 8th International Command and Control Research and Technology Symposium, National Defense University, Washington, DC, 17-19 June 2003.

Appendix 1: Background to CCA

The basic ideas of CCA were first introduced to the military in 1997 under a project for the UK Ministry of Defence (MOD). It was soon recognized by senior NATO officers who had commanded or were commanding stabilization and reconstruction-type task forces that the CCA approach promised to fulfill an urgent military need. Consequently, the following work has been undertaken since 1997 to develop the concepts of C2CC.

1997	Preliminary investigation into use of drama theory and CA (Confrontation Analysis) in PO (Peace Operations). Conducted by ISCO Ltd. Funded by DERA (UK Ministry of Defence).
1998-99	Research on formulation and devolution of Confrontation Strategies. Discussions with DSACEUR. Research trip to Bosnia sponsored by SHAPE, hosted by OHR. In-theatre interviews with D-COMOPS (Sarajevo), COM MND(N) (Banja Luka) and a number of NGOs. Conducted by ISCO Ltd. Funded by DERA (UK Ministry of Defence).
1998-99	Completion and publication of book *Confrontation Analysis: How to Win Operations Other Than War*. Conducted by ISCO Ltd. Funded by CCRP.
1999	Research trip to Bosnia sponsored by SFOR. Interviews with DSACEUR; COMSFOR and XO to COMSFOR; DCOMOPS(SFOR); COM MND(N); COM MND(SW); 1 Brigade Commander, 6 Battalion Commanders, 12 Company Commanders and 8 staff officers in MND(N) and MND(SW). Interviews also with representatives of OHR. Funding: Expenses paid SFOR, work contributed by ISCO Ltd and CCRP (Richard Layton).
1999	Report comparing practice of PO in Bosnia with CA theory. Conducted by ISCO Ltd. Funded by CCRP.
1999-2000	Mission Capability Package for implementation of CA as a method for PO. Conducted by ISCO Ltd. Funded by CCRP.
2001	Study of Doctrinal Implications of CA. Conducted and funded by UK JDCC (Joint Doctrine and Concepts Centre).

2001	Research trip to observe NATO Exercise Allied Effort 01 to assess the (implicit) C2CC that was being used. Conducted by dramatec.
2002	Report assessing the implicit C2CC system used in Allied Effort 01. Written by dramatec. Funded by CCRP.
2002	Training/awareness session given to flag officers at RHQ AFNORTH in the basic ideas of C2CC. Decision to test elements of C2CC in Exercise Allied Action 03.
2000-03	Research Program to Test Psychological Foundations of Drama Theory. Needed to ensure validity of methods used in a C2CC system. Conducted by DERA and ISCO Ltd. Funded by DERA (now QinetiQ).
2000-03	Research Program to Develop Mathematical Foundations of Drama Theory and Confrontation Analysis. Needed to develop C2CC system. Conducted by DERA and ISCO Ltd. Funded by DERA (now QinetiQ).
2002-03	Discussions with SACLANT (now DSACT) regarding a program to develop C2CC. Appointment of an officer at ACT to forward this program.
2003	Discussions with JFCOM regarding a trial of C2CC to be conducted by Joint Experimentation.

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2) Smith, R., Howard, N. and Tait, A. 'Confrontations in War and Peace.' CCRTS Symposium, 2001.

3) Murray-Jones P., Howard N. 'Foundations of a Decision Support System for Peace Operations: Designing Experiments to Test the Psychological Hypotheses of Confrontation Analysis', CCRTS Symposium, 2001.

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5) Smith, R., Howard, N. and Tait, A. 'Commanding Anti-Terrorist Coalitions: A Mid-East Illustration.' CCRTS Symposium, 2002.

6) Baan A, Howard N, Tait A, ' "COM as Shooter" - Operational Planning using C2 for Confronting and Collaborating'. CCRTS Symposium 2003.

7) Murray-Jones, P., Stubbs, L. and Howard N. 'Confrontation and Collaboration Analysis: Experimental and Mathematical Results'. CCRTS Symposium, 2003